JOURNAL
OF THE
AMERICAN VETERINARY MEDICAL ASSOCIATION

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Volume CXIV **MAY 1949** **Number 866**

OMAHA
THE COUNTRY PRAC-TITIONER
DESERVEDLY FAMOUS IN THE U.S.A.
To the candid reporter, the remark that capital invested in animal production is safe in the United States is not complete without adding that the bedrock of that high rating is the clinical branch of the veterinary service in general and the rural practitioner in particular.
Otherwise expressed, shielding the principal asset of 142 million people—the health of 200 million domestic animals worth $10 billion—is the heavy load borne by less than 9 thousand college-trained veterinarians practicing in country districts.
SPEAKING FROM OBSERVATION ON A LARGE SCALE THROUGH NORMAL AND ABNORMAL TIMES, KEEPING KEENLY INFORMED ON TECHNICAL KNOWLEDGE WAS FOUND TO BE THE BACKGROUND OF THE GENERAL PRACTITIONERS' REMARKABLE ACHIEVEMENTS.
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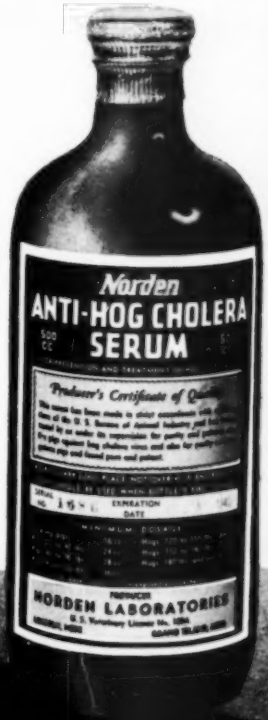

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1. Blair, H. E.: Unpublished data.
2. Enzie, F. D.: Proc. Helm. Soc. Wash. *14*:35-44 (Jan) 1947.
3. Craigs, A. H. Jr., and Kleckner, A. L.: North Am. Vet. *27*:26-30 (Jan) 1946.

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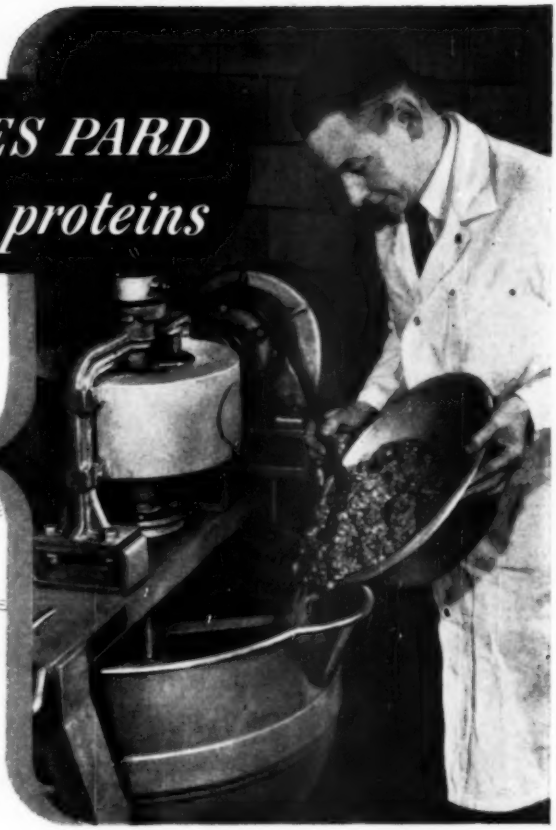

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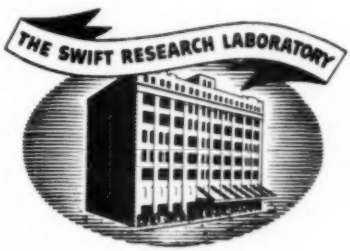

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* *Keeney, E. L. and associates. Bull. Johns Hopkins Hospital 77:422, 1945*

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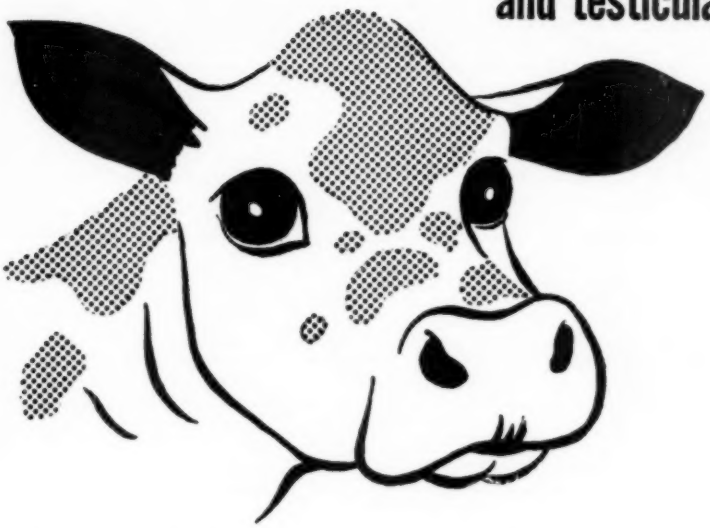

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AVMA ☆ *Report*

Veterinary Medical Activities

★ Mrs. A. E. Bott and Mrs. C. L. Miller, president and secretary, respectively, of the AVMA Women's Auxiliary, report that the wives of veterinarians enjoy reading the "Women's Auxiliary" column in the news section of the JOURNAL. Both are working earnestly to expand the scope of this column and they urge coöperation of state, territorial, provincial, and student auxiliaries in submitting interesting items.

• • •

★ Dr. W. A. Aitken, member of the AVMA Council on Education, visited the Atlanta (Ga.) VMA on January 31, and outlined the duties of the Council. In so doing, he discussed the functions of some of the individual council members, and the results of council efforts.

• • •

★ Student Chapter problems at Iowa State College were reviewed by the Executive Board of the ISC Chapter and Dr. R. C. Klussendorf, assistant executive secretary, at Ames on March 28. On April 1, he also discussed similar problems at a special meeting of the Kansas State College Student Chapter.

• • •

★ Livestock Conservation Days were organized for 4-H Club members and leaders by Mr. Harry J. Boyts and Dr. Wm. T. Spencer, respectively, for March 30 at Sioux City, Iowa, and for March 31 at Omaha, Neb. About 750 members and leaders heard Dr. Klussendorf speak on "The Veterinarian and 4-H Club Work."

• • •

★ "Did I get that title correct, Doctor?" This question was asked when Dr. C. D. Van Houweling was introduced as AVMA director of professional relations by Mr. Tom Farley on the radio program "Dog Tales." "Yes, you did. But let's just say I'm a veterinarian." "That's a mighty fine title as far as I'm concerned," was the reply. This program, which will highlight the activities of the AVMA, was transcribed in Chicago, and will be broadcast soon all over the United States.

• • •

★ Popular American dictionaries neglect to state that the veterinarian is a Doctor of Veterinary Medicine, although they identify the physician as a Doctor of Medicine. The AVMA has written to leading dictionary publishers, recommending changes in the definitions of "veterinarian" and "veterinary." One publisher's answer appears on p. 343 in this issue.

• • •

★ A scientific exhibit committee, consisting of Drs. J. S. Bengston and C. D. Van Houweling, Chicago; Geo. W. Jensen, Antioch, Ill.; and C. R. Donham, Lafayette, Ind.; has been assembling material on brucellosis. This material is now in the hands of a display studio, and will be presented at the meeting of the American Medical Association at Atlantic City in June, and at the AVMA Convention in Detroit in July.

• • •

★ The AVMA staff recently responded to a request from an author of children's school books, who was writing a story about a "foundered" pony. As a result, the symptoms shown by the pony and the treatment administered by the veterinarian were correctly portrayed.

• • •

★ Dr. A. H. Quin, chairman, Public Relations Committee, and Mr. L. R. Fairall, public relations counsel, spent a day in the Chicago office recently to coördinate material for the guidance of recent graduates about to enter practice. Several members have collaborated in preparing this material which should be ready in leaflet form soon.

• • •

★ Dr. J. G. Hardenbergh, executive secretary, and Dr. B. J. Killham, chairman of the Local Committee for the Detroit Convention, have been working on meeting details, and they report that the way is clear for the biggest and best AVMA Convention ever. The dates: July 11-14.

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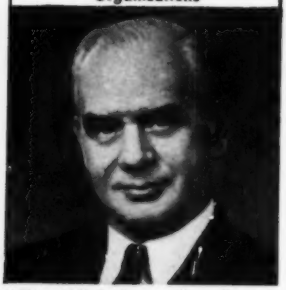

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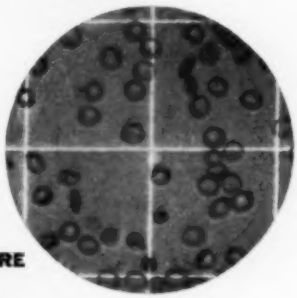

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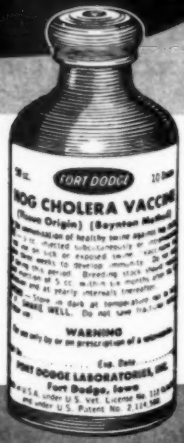

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The Importance of Radioactive Isotopes to Veterinary Science

LOGAN M. JULIAN, D.V.M.
Berkeley, California

AMONG the fears that arose at the advent of the practical application of atomic energy to the ends of war, there grew a benefit which can only be measured in the future. This benefit, the application of radioactive isotopes to the problems of the biologist, will be measured by the solutions to scientific problems which can only be solved by the utilization of isotope techniques. Since radioisotopes are important to the development of basic sciences, it is interesting and important to the veterinarian to obtain general information as to their use and significance.

Last year, Dr. J. W. Buchta introduced the subject of the use of isotopes in his address to the annual meeting of the American Veterinary Medical Association at Cincinnati. Since the context of Dr. Buchta's address has been recently published,[1] it will be unnecessary to discuss in detail the nuclear physics necessary to answer the question, "What are isotopes?" A simple review should suffice. This time will be spent in discussing what can be done with isotopes, what has been done with isotopes, and how they are important to veterinary science.

REVIEW OF NATURE OF RADIOACTIVE ISOTOPES

In briefly reviewing pertinent facts concerning the nature of radioactive isotopes, let us consider figure 1. This represents the conventional illustration of the structure of a simple atom, helium. The atom is, mainly, composed of three fundamental particles—a proton, a neutron, and an electron. The proton and neutron each have a mass of 1; the electron has a mass which for our purposes may be considered negligible. The electrical charge of any atom is neutral, yet, as here illustrated, the atom is composed of charged particles. The protons exhibit positive charge; the electrons exhibit negative charge. The neutrons are neutral, and add only mass to the nucleus of the atom. To obtain the state of electrical neutrality, the number of positive charges must equal the number of negative charges; or the number of orbital electrons, each exhibiting a negative charge, must equal the number of protons, each exhibiting a positive charge.

It is the orbital electrons which determine the chemical activity of the atom. If the number of protons of the nucleus is changed, then the electrons must change, since electrical neutrality must be maintained, and the result is an element of different chemical nature. On the other hand, since the neutrons contribute only mass to the nucleus, their numbers may be changed without affecting the chemical activity of the atom. Therefore, the weight of the nucleus of a given atom may be increased without changing its elemental form. Elemental forms of varying weights are called isotopes. Hydrogen, in its most common form, has an atomic mass of 1, having a nucleus of a single proton. However, there are hydrogen isotopes of mass 2 and 3. These each contain one proton, and, therefore, have the required charge of hydrogen and also one or two neutrons. Some isotopes, such as hydrogen 3, can be produced artificially by the use of powerful machines such as the cyclotron or the atomic pile. The artificial formation of isotopes involves the altering of the nucleus by the inclusion of either mass alone, or charge and mass in the form of neutrons or protons, or combinations of these fundamental particles into the nucleus. In many cases, the internal energies of the nucleus are so rearranged that the atom is spoken of as being in an unsteady state. These atoms must revert to a more stable form. The transition from an unstable energy state to a stable condition is accomplished by the expulsion of energy in one of the forms shown

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in figure 1. These isotopes are radioactive. The radiations most commonly produced in isotopes of medical interest are the *alpha*, *beta*, and *gamma* rays.

Figure 2 demonstrates the formation of a common radioactive isotope (radiophosphorus) by the machines of modern physics, the cyclotron and the atomic pile. The cyclotron bombards target elements with positively charged

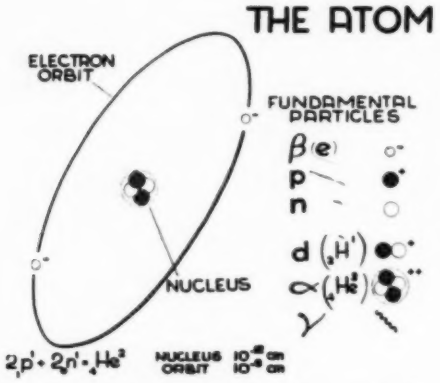

Fig. 1—Conventional illustration of the structure of a simple atom. The subscripts and superscripts of hydrogen and helium should be reversed to satisfy the conventional plan of denoting charge and mass.

particles, such as protons, deuterons (nuclei of heavy hydrogen), or *alpha* particles (nuclei of helium atoms). Figure 2 demonstrates the formation of radiophosphorus by the bombardment of normal phosphorus atoms by deuterons. In the ensuing reaction, the neutron of the deuteron is retained, and the mass of the atom is changed. Since no change has occurred in the charge of the nucleus, the resultant atoms are still phosphorus atoms and will act in a chemical or biologic system in the same manner as normal, stable atoms of phosphorus. The second formula shows how radiophosphorus is made in the atomic pile. In this case, a neutron is added to the atom of sulfur. In the ensuing reaction, one unit of charge is lost and P^{32} is formed. This P^{32} is just like that formed in the cyclotron; both are chemically like the P^{31} of nature. At a later date, P^{32} will revert to a stable atomic form by the expulsion of energy in the form of an electron. This electron is expelled with sufficient energy to be detected by modern physical instruments such as the Geiger counter which is becoming more and more the tool of the biologist as well as the physicist. All of these reactions are based fundamentally upon the interrelation of mass and energy as expressed in the Einstein formula.[2, 3]

VALUE OF ISOTOPES TO THE SCIENTIST

We are now in a position to answer the question of what makes isotopes valuable to the biologist. First, a radioactive isotope, chemically, is not different from the normal, stable atom of the respective element. It acts in a physiologic system in the same manner as the normal atom form. Upon injection into animals, radioactive phosphorus will be found with normal phosphorus in bone. Radioactive iron will be found in red blood cells combined in the molecule of hemoglobin, just as nonradioactive iron is found in hemoglobin. Secondly, the isotope can be detected. That is, if a given quantity of radioactive material is injected into an animal, the element can be traced throughout the body. Wherever radioactivity is found, the worker will know that the atoms represented by such radioactivity are those which he placed in the animal. Along with the normal metabolic procedures, radioactive atoms

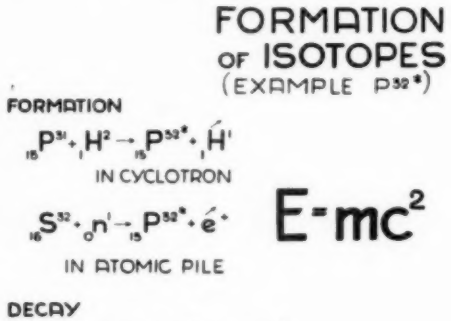

Fig. 2—The formation of radiophosphorus by the bombardment of normal phosphorus atoms by deuterons.

have been utilized with stable atoms, since the body cannot distinguish the two. The normal constituent of the body has been "tagged." Figure 3 schematically demonstrates what is meant by tagging. Let the dose of radioactive material be represented by ten black spots, and the supply of the element available to the animal be represented by a flask of 100 white spots. If, after complete mixing, a sample of ten dots is taken from the flask, theoretically, one radioactive atom will have been sampled. If 30 spots are removed, three radioactive atoms would be sampled, and the second sample would be three times as radioactive as the first. The radioactivity will be proportional to the metabolism of the normal body constituent. If we tag the phosphorus pool of an animal and later

sample the tissues, we would find that the activity of skeletal muscle and liver would be similar to the two imaginary samples we have just discussed. We would find that the liver was approximately three times as active in the metabolism of the initial dose of phosphorus as skeletal muscle.

Much emphasis has been placed upon radioactive phosphorus in the discussion to this point. However, the considerations thus far presented apply in general to all radioactive isotopes.

How Isotopes Are Used

At the present time, the greatest benefits that veterinary medicine has derived from the use of isotopes are indirect, derived from the advancement of the basic sciences upon which veterinary medicine is founded.

Three techniques are employed in the use of isotopes in medical research.[4]

The *in vitro* technique involves the administration of the isotope-containing material, sacrifice of the animal at a later time, and analysis for radioactivity in the various organs and tissues. It is by this technique that most of the so-called "simple" tracer experiments have been conducted. These experiments answer the question, "What is the fate of an element or compound upon entering the body?" Results of experiments of this sort have demonstrated that each organ presents a particular pattern of uptake and release of an element when a single dose has been injected. For instance, the liver, spleen, and kidney take up phosphorus rapidly, whereas the brain takes up phosphorus slowly. Studies using the *in vitro* techniques have demonstrated an important fact in iron metabolism. The iron stores of the body are mainly controlled by absorption and not by excretion. That is, once iron is incorporated into the body, very little leaves.[5] If the body requires more iron, it absorbs it; but if the body has an excess of iron, it appears that it has but limited means of ridding itself of the element. This fact was rather simply arrived at by determining that once radioactive iron was incorporated into the body (by experimental injection), essentially none of it was detected by the routes of excretion. Only by having a means of distinguishing the injected iron from the stable iron of the diet could these facts be arrived at.

A second method of isotope research is called the *in vivo* technique and involves the use of isotopes with radiations of sufficient energy that their presence and concentration may be determined from the exterior of the body, and thus allow repeated determination on an experimental animal without sacrifice of the animal. Radiosodium and radioiodine are isotopes emitting powerful *gamma* rays which penetrate the body readily and, thus, allow simple detection by placing a Geiger counter over the part to be studied. Radioiodine has been used to study thyroid metabolism in health and disease.[5] In this case, the counting device was placed over the thyroid gland and the concentration of the isotope in the gland studied. Thus far, the studies on the thyroid gland have been directed toward known thyroid disorders, but the question often arises as to the state of thyroid metabolism in many alleged metabolic diseases. This field, the study of thyroid metabolism in various disease states with the aid of radioiodine, should hold promise for medical and veterinary research.

The third method in the application of radioactive isotopes to biologic research is termed the radioautographic technique. It is based on the fact that radiations from isotopes will expose photographic films, just as do x-rays. The method consists of exposing film to tissue which has been taken from an animal previously injected with an isotope. If radioactivity is present in the tissue, the radiations will expose the film, and the points of exposure may be correlated with the histologic structure of the tissue. The value of this technique lies in the fact that it will define the cells or portions of a tissue which are the most active in the metabolism of the isotope under study.

By employing radioisotopes in the three techniques described above, new horizons of biologic research have been opened. In describing these techniques, examples have been limited to inorganic studies. It has not been the intention to imply that isotopes need be used only in the elemental form. Organic compounds, synthesized to contain radioactive isotopes, have resulted in a very rapid advancement of our knowledge of intermediate metabolism, protein synthesis, and toxicology of certain organic compounds. Radioactive carbon is the element of major importance in the synthesis of tagged organic compounds, although radioactive sulfur has been employed in the formation of such biologically important materials as thiamin. Once an organic compound contains an active atom, that compound is tagged and can be traced as long as the radioactive atom remains in its structure. The Atomic Energy Commission has recently announced[6] the availability of a large number of intermediary synthetic hydrocarbons, labeled with radiocarbon (C^{14}). These compounds can be used by chemists in the preparation of a

variety of larger carbon-containing molecules of interest to biology, nutrition, and the medical professions. Radioactive male and female hormones have recently been announced.[7, 8] Considering the importance that hormone therapy has assumed in the veterinary profession in recent years, the profession may again be benefited by isotope research, once these valuable compounds have been employed in studies on hormone metabolism.

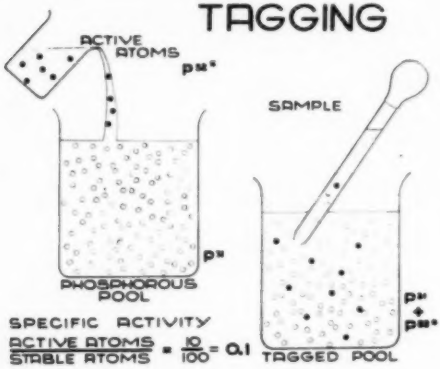

Fig. 3—Demonstration of tagging.

To gain a further appreciation of the potentialities of the use of isotopes and the significance, thereby, to veterinary medicine, it is appropriate to consider briefly a few of the problems which have been studied by the use of isotopes.[5]

Fluid balance is an important consideration in medical and veterinary medical practice. Proper volumes in the tissues, interstitial fluids, and the circulating blood must be maintained to insure satisfactory treatment. The use of radioactive isotopes has presented at least three new techniques for the determination of the various fluid compartments of the body. These techniques have, in several cases, proved more convenient or more successful than prevailing techniques, and have proved useful in research on the effects of physiologic and pathologic conditions on the fluids of the body. These techniques involve the calculation of the dilution which occurs when a sample of radioactive material is mixed with the fluids of the compartment under study. The total water volume of the body can be determined by the use of samples of radioactive water prepared by the oxidation of radioactive hydrogen. The combined volume of interstitial fluids and the plasma volume can be determined by the calculation of the sodium space with the use of radioactive sodium. The volume of the circulating blood can be determined by the use of a given quantity of radioactive red cells, and the calculation of the dilution of the cells which has occurred when they have had an opportunity to mix with the cells of the test animal. The radioactive cells are prepared by feeding or injecting radioiron into an animal and waiting until the iron has been incorporated into the newly formed red cells. These cells may then be withdrawn from the first animal and injected into the animal to be tested. The volume of the interstitial fluid may be derived by subtracting the volume of the plasma (as determined by a hematocrit) from the determination of the sodium space. Therefore, the volume of the fluid compartments of an animal may be measured by the use of isotopes. Since fluid volume is closely related

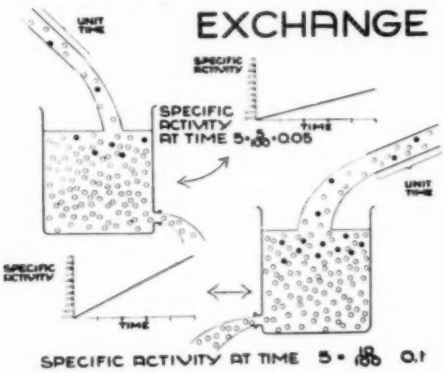

Fig. 4—The two flasks represent two tissues of differing rates of phosphorus exchange.

to mineral balance, it would seem that the combination of isotope studies on mineral and fluid balance should prove of use in elucidating such disease syndromes as canine nephritis, many acute infectious diseases, and metabolic disturbances such as acetonemia and eclampsia.

Mineral metabolism is an important subject to many aspects of veterinary medical practice. Not only do distinct clinical syndromes exist which are the result of faulty mineral metabolism, but the subject is important from early fetal life to the pathologies of advancing age. The radioactive isotopes present valuable possibilities in the study of skeletal metabolism. From these studies has developed appreciation of the knowledge that the skeleton is not a permanent structure. This means that atoms which are incorporated into skeletal tissues do not stay there indefinitely but, at a later date, are again re-

leased into the general mineral pools and are replaced by other atoms. Calcium and phosphorus metabolism can be studied by the use of appropriate isotopes. This fact allows many direct and indirect studies upon bone metabolism. For instance, studies on the effects of various diets upon the mending of broken bones have been carried out. These studies involved the influence of vitamin-deficient states upon the subsequent ossification and reëstablishment of suitable breaking strength of broken bones. The studies have served to demonstrate a procedure by which the effect of various mineral deficiencies or intoxications upon bone structure may be studied. Fluorine and magnesium are known to be concerned in bone physiology; yet, unfortunately, there are no suitable, easily employed isotopes of these important elements. The isotope technique may be employed by using the isotopes of bone which are related to these elements (calcium and phosphorus metabolism).

RADIOACTIVE ISOTOPES IN CANCER RESEARCH

Cancer research is daily being advanced by the use of isotopes. Radioactive elements, tagged amino acids, and tagged hormones are new tools to cancer investigations. Since domestic animals are subject to neoplastic diseases and various growth disorders, the field of comparative pathology may contribute heavily to the better understanding of growth and neoplasia. An intriguing phase of current cancer research is the use of radioactive phosphorus in the study of growth of neoplastic tissue. Since phosphorus is utilized in a wide variety of bodily processes—the element is found in both inorganic and organic forms in all tissues and body fluids—the rate of utilization of phosphorus may be taken as an index of growth rate. A distinguishing feature of neoplastic tissue is a growth rate in excess of that of the same normal tissue. Lawrence and coworkers pioneered the field when they found that a large proportion of a dose of radiophosphorus was found in neoplastic tissue of animals carrying transplanted tumors.[5, 9]

Since quantitative studies revealed that neoplastic tissue contained no more phosphorus than the respective normal tissue, these workers concluded that the greater quantity of tagged phosphorus was due to increased rate of exchange. Biologic exchange is the result of uptake and discharge of an element of compound by a tissue.

In figure 4, the two flasks represent two tissues of differing rates of phosphorus exchange. If the available phosphorus supply to the organs has been tagged in such a manner that there is one active atom for each five atoms, in a unit of time, the first organ takes in one active atom. The other organ, since it takes in twice as much in a unit of time (10 atoms) will take up two active atoms. Since the concentrations of normal constituents of tissues are fairly uniform, a similar quantity of the material must leave the organ; but this material, being present before the phosphorus supply was tagged, is inert. The net result of these conditions is that the second tissue obtains radioactive atoms twice as fast as the first. This condition will continue until the tissues reach an equilibrium with the phosphorous pool (until all the original material has been exchanged for new, tagged phosphorus). The second tissue will reach an equilibrium twice as fast as the first. At intervals between the time of tagging and the reaching of final equilibrium, the two tissues will show a marked contrast in radioactivity content, which might be expressed in terms of specific activity (ratio of active atoms to stable atoms). Neoplastic tissue has a greater phosphorus exchange than the corresponding normal tissue.

These facts have aided in elucidating concepts of growth, both normal and pathologic, and in giving the investigator a means of measuring the progressive, continuous nature of bodily processes. It may be said that the radioactive isotope, in allowing a convenient means of expressing the dynamic activity of tissues, has done for the biologic sciences what calculus has done for mathematical and physical sciences.

The fact that neoplastic tissue takes up proportionally more of the tagged dose of phosphorus has led to attempts to selectively irradiate neoplasms. The rationale of this therapy exists in the view that, since the rapidly growing and rapidly metabolizing tissue takes up more isotopes than do the surrounding tissues of normal growth rate, the abnormal tissue will irradiate itself. These attempts have been successful in prolonging the life of individuals suffering from growth disorders, such as polycythemia vera, toxic goiter, and certain true neoplasms.[5] The exact position of isotopes as therapeutic agents in medicine is not at the present fully evaluated.

SUMMARY

A radioactive isotope is an elemental form which occurs naturally or may be produced artifically. The internal energies of the nuclei of radioactive isotopes are so

arranged that energy must be discharged in the passage of the atom from an unstable state to a stable one. The fact that the emanation can be detected, plus the fact that the isotope of a physiologically important element cannot be differentiated by the body from stable atoms of the element, makes the use of radioactive isotopes of value to biologists and the medical sciences. By the application of the three basic isotope techniques, radioactive isotopes have furthered our knowledge of basic and clinical subjects. The developments due to isotope studies in the basic sciences have already been incorporated in the textbooks commonly utilized in veterinary education.

At the present, it would appear that radioactive isotopes will not immediately be applied to routine clinical veterinary use. Two major factors enter into the formation of this statement. The first is that the isotopes have not, as yet, been properly evaluated as therapeutic agents. The second deals with the inherent health hazards of the isotopes; hazards which, at present, are not fully appreciated. The radioactive isotopes remain research tools which promise constantly enlarging knowledge to the medical sciences.

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The Fleetway Tunnel under the Detroit River, showing the boundary between the United States and Canada.

Atomic Energy

The use of atomic energy (chain reactions) for peaceful pursuits may lie in the distant future but that does not dampen the high expectations of the scientists.—*Science.*

• • •

Temporary or permanent sterility (in animals) may be produced by atomic bombs. . . . The effect of atomic bombing on food stockpiles will be one of the veterinary problems of future warfare. . . . The direct effect of an atomic bomb detonation would be of immediate concern to the military and civilian veterinary service. . . . The immediate and prolonged radioactive hazards, radioactive detection inspection, and supervising the shipment of radioactive food have fallen among the problems of the veterinary corps. . . . Planning against atomic warfare by the veterinary profession will include the dispersion of personnel, facilities, equipment, and drugs to rural communities.—*Kester et al., J.A.V.M.A., March, 1949.*

Scorpions (*Prionurus australis*) living at liberty under natural conditions succumbed to exposure to DDT powder (5%), according to trials carried out by the Pasteur Institute of Algeria, but resisted sprays of the same strength in suspension.

Graduate Work in Tuberculosis.—Hundreds of physicians (*J. Am. M. A.*, March 12, 1949) go to Denmark and the other Scandinavian countries to study the methods pursued in the control of tuberculosis. The Danish Red Cross provides free resident and postgraduate training for hundreds engaged in tuberculosis work. Veterinary journals of these countries report close coöperation with the public health functionaries.

Panel Discussion on Veterinary Public Health

At the San Francisco Session of the Association, the Section on Public Health conducted a panel discussion. The members of the panel were Dr. J. H. Steele, Atlanta, Ga., moderator; Dr. Robert Dyar, San Francisco, Calif.; Dr. A. K. Carr, Sacramento, Calif.; and Dr. J. D. Vagneur, Grand Junction, Colo. The following is a condensation of the remarks of the panel members and of their discussion of questions asked from the floor of the meeting.

Dr. R. Dyar (San Francisco, Calif.) opened the panel by defining public health as the art and science of preventing disease, prolonging life, and promoting physical health and efficiency through organized community effort.

Veterinarians have carried the major responsibility in four fields: meat inspection, milk sanitation, inspection and establishment of standards for animal produce, and the control of animal diseases transmissible to man. The last is the item for discussion.

Although the public health officer has actively supported each of these fields, progress is sometimes disappointingly slow because of the lackadaisical attitude of many practicing veterinarians toward problems of community health, lack of research in the several branches of veterinary public health, and the failure of the colleges to teach this subject adequately and interestingly. Medical schools have been equally negligent in this respect.

Dr. A. K. Carr (Sacramento, Calif.) called attention to the fact that the public health laws, like all other laws, express the wishes of the people. They can be enacted and enforced only through legislation and the appropriation of money raised by taxation. Public education and appreciation of the economic importance determine the legislative speed. The practicing veterinarian can be an important factor in this educational program by furnishing facts to his clients and official reports to regulatory officials of the incidence of animal diseases, especially those transmissible to man.

Dr. J. D. Vagneur (Grand Junction, Colo.) emphasized the fact that the practicing veterinarian is in a strong, strategic position at this time. Many local health units are being organized in a concerted, nation-wide effort. The veterinarian is welcomed by the physician because of his technical training, and he is accepted by the public because of his practical training. This combination of technical and practical training should encourage participation by practicing veterinarians in the activities of the health units. However, there has been some tension between the practitioner and the public health veterinarian, and when this has resulted in keeping the local veterinarian out of the public health unit, his place has been taken by a sanitary engineer who has tried to do the work of the veterinarian. This can not be done effectively, unless a veterinarian remains in a supervisory or advisory capacity.

Dr. J. H. Steele (Atlanta, Ga.) spoke briefly of the accomplishments in the control of communicable diseases, in meat inspection, in eradication of bovine tuberculosis, and in the development of a veterinary public health service, first by the Veterinary Corps of the U.S. Army and later in various communities by civilian effort. This latter development has been most effective when the local practicing veterinarian participated because of his interest in his personal health, his responsibility to his clients by preventing the spread of disease, and his recognition of the effect of widespread disease upon the prosperity of his community.

Question.—What is the value of mass equine immunization, of vector control, and of avian wildlife reservoirs in the control of human cases of equine encephalomyelitis?

Dr. Dyar.—In California, 25 per cent of all mosquito pools studied contained virus-infected larvae, but there is no information on the probable effect which elimination of these pools would have on the number of human cases. There is a similar lack of knowledge regarding the results to be expected if birds known to be reservoirs could be effectively controlled or reduced.

Dr. Carr.—The practicing veterinarian has not been told how his work fits into the public health program in connection with this disease, so he considers the vaccination of horses only from the economic side—as a means of protecting and conserving livestock. Therefore, a valuable source of information has been lost because we have not trained practitioners to observe and report on this point.

Dr. Steele.—The state of Washington decided that mass immunization of horses was necessary to reduce the potential reservoirs, while admitting that it can be positively stated only that the horse plays some

part in dissemination of the disease to man. Horse immunization must continue, even if the mosquito population is held in control; and after avian wildlife reservoirs have been determined, it will still be necessary to control mosquitoes and immunize horses on a mass basis.

Dr. C. K. Shane (Lemon Grove, Calif.)—Chicken embryo vaccine is a strong immunizing agent and should continue to be used widely.

Dr. Dyar.—We do not have information which permits us to say that mass immunization of horses has affected the incidence of human encephalitis.

Dr. E. S. Tierkel (Montgomery, Ala.)—The avian wildlife reservoirs have been grossly over-estimated as potential sources of human infection, while horses have been under-estimated. It is true that virus has been isolated from avian wildlife in areas where there was no human infection.

Dr. Dyar.—Is human encephalitis associated only with immunization of horses, or do vector control programs deserve some of the credit?

Dr. H. G. Stoenner (Hamilton, Mont.).—In Louisiana, human cases occurred after the peak of equine cases, indicating that they are not due to a common source of infection.

Dr. Dyar.—That was true in California, also, but does not permit us to assume that there is no positive correlation between the two.

Dr. R. J. Huebner (Bethesda, Md.).—The intensity of research depends upon a realization of the problem and upon cooperation between practicing veterinarians, physicians, public health workers, disease control officials, and residents of a community. Research must be carried to the field, where naturally occurring cases can be observed. In California, city and county health departments, state departments of health and agriculture, and the dairy industry all backed the move.

Dr. A. J. Creely (San Francisco, Calif.).—The practicing veterinarian is criticized for not initiating and campaigning for public health programs, but is not advised how he can do this effectively.

Dr. Oscar Sussman (Phoenix, Ariz.).—The practicing veterinarian can not initiate public health programs. In rabies, for example, if he recommends mass vaccination of dogs (in the papers, at meetings, or even in private conversation), he is immediately pointed out as trying to establish a racket, or of trying to increase his income. The state veterinarian and the BAI veterinarian in charge should conduct the educational program, with the practicing veterinarian doing the work—including the vaccinating.

In encephalomyelitis, many veterinarians and health officers believe that mass immunization of horses is important to the public health, but the practicing veterinarian can advocate it only as an economic or livestock conservation program.

Question.—Should local milk ordinances require annual bovine tuberculin tests?

Dr. Dyar.—No. This should be done at state level.

Dr. Vagneur.—Agreed. But when not provided at state level it should be part of the local ordinance.

Dr. Steele.—New Mexico is the only state now requiring annual tests for grade A milk.

Dr. John Ranken (Astoria, Ore.).—Oregon requires annual tests for tuberculosis and brucellosis for all herds supplying grade A milk, and semiannual tests if the grade A milk is unpasteurized.

Dr. A. K. Kuttler (Washington, D. C.).—Annual tuberculin tests should be provided for, either on the local or the state level.

Dr. Steele.—The United States Public Health Service is modifying its uniform milk code, and recommends that all communities adopt this code which includes a requirement for annual tuberculin test. In this manner, the responsibility for control and eradication of animal diseases is placed upon the local practicing veterinarian.

Question.—Does compulsory pasteurization obviate the necessity for annual tuberculin testing?

Dr. Steele.—We can not put all of our faith in pasteurization, because frequently it is not as successful as we assume it to be. Argentina recently reported a survey in which 26 per cent of the pasteurized milk samples collected in Buenos Aires contained viable Brucella organisms. Whether this was due to human or to mechanical error is not established, nor do we know how often similar errors occur in this country. However, enzyme is frequently found in pasteurized milk samples subjected to the phosphatase test.

Dr. Huebner.—In dealing with Q fever, pasteurization is no solution to the problem of control. Removal of infected animal reservoirs is the only effective measure known.

Dr. Vagneur.—Dairymen will often demand annual tests when they have been educated to the immediate and the long-time economic effect of disease upon livestock and the market for livestock products.

Dr. Steele.—Indiana showed that 70 per cent of its human brucellosis was occupa-

tional—40 per cent on farms and 30 per cent in other industries. The remaining cases had no history of animal contacts. Ingestion of Brucella-bearing foods is suspected but not established.

Question.—Is it necessary to test milkers as well as cows?

Dr. Steele.—Bovine tuberculosis seldom spreads from man to cows, but this is still important in many foreign countries. The simultaneous testing of milkers and cows should be routine procedure.

Question.—What part can a practicing veterinarian play in organizing a local health department?

Dr. Vagneur.—He should be active in the formation of a public health council, and he should occupy a place on the board of health.

Dr. Carr.—We have no way of reaching the private practitioner in order to advise him regarding the steps he may take to help in organizing a local health department. Neither do we know what to tell him if we could reach him.

Dr. M. D. Baum (Denver, Colo.).—The Colorado State Board of Health answers requests for information from physicians and local health departments by saying that there is a veterinarian practicing in the community, and that he should be consulted. A copy of this letter goes to the local veterinarian, with an invitation to call on the State Health Department if help is desired.

Dr. Dyar.—The practicing veterinarian is responsible for becoming acquainted with the local health officer and the local health organization. Then he can report conditions which affect public health.

Dr. F. D. McMahon (Phoenix, Ariz.).—The Arizona Veterinary Medical Association offered its services to the health officers in each of the counties. When there was no member of the Association in a county having trouble with rabies, the Association arranged to have a member assist the local health unit in bringing the outbreak under control. This coöperation was responsible for the biggest and most effective rabies eradication program.

Federal Views of Feeds and Drug Supplements

The U. S. Food and Drug Administration has issued the following advice on feeds and on drugs which directly influence feed utilization and growth of livestock:

Moldy Feed.—The FDA regards this as neither safe nor suitable for animals and, therefore, it is legally an adulterated article.

Drug-Containing Feeds.—When drugs are mixed in feedstuffs, the entire mixture is regarded as a drug, the feed being considered as a drug vehicle. The trade name must indicate beyond question that the product is a drug, and the label must include indications for use, detailed directions from the basic manufacturer, adequate warnings, list of active ingredients, and an analysis as required by state feed laws.

Thyroprotein (Iodinated Casein).—This has been approved by FDA solely on the grounds of its safety for poultry and dairy cows in dosages recommended by approved manufacturers; an application for marketing of a complete feed containing this drug also has been approved.

Thiouracil.—Its safety for animals and for consumers of meat products is still in doubt. From the standpoint of insulin production, it will be important to learn its effect on the pancreas of hogs.

Diethylstilbestrol Implants.—Approval has been given to several pelleted preparations containing 15 mg. of diethylstilbestrol for implanting under the neck skin in cockerels, but approval has not been given for the mixing of synthetic estrogens in feeds.—*H. E. Moskey, D.V.M., Washington, D. C.*

"Restrictive Animal Health" Legislation

"The Animal Health Institute has been very active and successful in beating down efforts in a number of state legislatures to enact bills which would restrict the use and sale of animal remedies to veterinarians. In most states, the Institute has had the active coöperation of the state pharmaceutical association. By mid-February, the Institute has chalked up victories in the Georgia, Nebraska, and Arkansas legislatures. Other restrictive animal health measures were pending in Missouri, South Dakota, Iowa, and Utah."—*From Am. Druggist, March, 1949.*

NOTE.—The Animal Health Institute is the "front" organization for the companies which manufacture and distribute animal remedies for sale direct to the laity.—ED.

Curriculums of veterinary schools have been improved recently, and further improvements will be possible but, up to now, there has not been much improvement in the clinical teaching. Methods are much the same as they have been for the last fifty years.—*W. A. Hagan, D.V.M., Ithaca, N.Y.*

Tattooing of the Thoroughbred and the Prevention of Fraud

JAMES N. FROST, D.V.M.

Ithaca, New York

THE FUTURE of horse racing depends largely upon the support of the public and how much they are willing to wager on the outcome of the races. In order that the public may be protected from some of the unfair practices in racing, the Thoroughbred Racing Protective Bureau was set up by the directors of the Thoroughbred Racing Association for the purpose of preventing fraud in Thoroughbred racing. To prevent "ringers," the Bureau felt it necessary to have better methods of identification. From an article in *The Blood Horse* of June 1, 1946, entitled "New Army Method of Branding," by Col. F. W. Koester, I quote:

> . . . First for the benefit of those who may not be familiar with the background of tattoo branding as it is now being used by the Army, it may be well to tell how it was developed. It originated at the Pomona Q M Depot (Remount), Pomona, Calif., formerly the W. K. Kellogg Institute of Animal Husbandry, donated to the Government in 1943. It resulted from a desire to permanently identify the recently acquired Arabian horses without detracting from their beauty by application of the standard Preston or hot iron neck brand used by the Army. . . .

In several species of animals, tattooing on the inside of the ear or elsewhere has proved practicable. However, the color of the skin of the horse, as well as a desire to make the brand nonevident upon cursory examination, led to the selection of the inside of the upper lip as the site for the brand.

Tattooing on the upper lip of the horse has been practiced by the British army for some time. Previous to the public announcements concerning remount branding of horses, the Thoroughbred Racing Protective Bureau had been studying all possible methods of identification of Thoroughbreds relating to night eyes, chestnuts, and tail imprints. Also, the Bureau had been in communication and conference with the Army Remount Service concerning tattooing. The final conclusion was that tattooing offered the best possible means of identification of Thoroughbreds and, accordingly, the Thoroughbred industry was introduced to the method that had been developed by the Army Remount Service.

This introduction was made in the historic spot of Saratoga, N. Y., on Aug. 15, 1946. Several months of work preceded the demonstration which took only a few days. On August 15, there were assembled at Saratoga racing veterinarians and horses from the leading stables of the country to be experimentally tattooed. Some of the older tattoos on remount horses were vanned in for observation. Colonel Koester and Captain Rubin were present to imprint new tattoos, and the press was there.

This demonstration elicited such general approval that the Bureau decided to take up tattoo branding at the point where the Army had left it, because it was felt that the importance of sound identification in the Thoroughbred industry justified still further refinement of the procedure. Accordingly, the wholesale branding of Thoroughbreds did not begin immediately. The procedure was subjected to study from every angle.

The science of horse identification by means of lip tattoo branding, as developed by the Thoroughbred Racing Protective Bureau, was unanimously approved by the directors of the Thoroughbred Racing Association, and, as such, is presently being applied by the Bureau's specialized branding crews to all Thoroughbred horses racing at member tracks of the Thoroughbred Racing Association.

DEVELOPMENT OF TATTOO BRANDING

To improve on the Army method of tattooing by hand, a set of blocks or dies was designed by the Bureau, each containing an arrangement of protruding needles at one end in the form of a letter, number, or digit.

Lip tattoo branding, now believed to be one of the most important factors in the true, rapid, and unmistakable identification of horses, provides a permanent and tamperproof system which will insure against ringers, or accidental substitution, and will inspire a greater confidence on the part of the public. A good lip tattoo depends largely upon the skill of the individual applying the numbers. It must be permanent, the numbers so spaced as to be easily photographed and read, and of a character difficult to alter or imitate. If the needles are not pressed firmly enough, so that the mucous membrane is punctured completely, the ink will be washed away by the saliva

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or moisture of the mouth. If the punctures are made too deeply into the submucosa, then hemorrhage may wash away the ink, resulting in a faint letter or number. Also, if made too deeply, the lymphatics may pick up the ink and carry it away in the lymphatic system, so that the numbers are not as distinct as they should be. With practice, one can tell how much pressure to apply to get the correct depth of puncture. Actually, the brand becomes an additional marking, distinctly and completely individualistic in each case and quickly legible.

The brand consists of the last four digits of the serial number appearing on the Jockey Club certificate of registration issued on the horse, plus a prefix letter indicating the year of foal, such as: "A" for foals of 1945; "B" for foals of 1946; "C" for foals of 1947; "Z" for foals of 1944; "Y" for foals of 1943; "X" for foals of 1942; etc. An asterisk (*) is used as a prefix to the serial number of imported horses registered with the Jockey Club.

MATERIALS AND METHODS

A complete set of branding dies, designed by and manufactured for the exclusive use of the Thoroughbred Racing Protective Bureau, comprises the most important part of the working tools. The set consists of the numbers 0 through 9, sufficient letters to enable the branding crews to tattoo horses ranging in age from 1 to 13 years, and the asterisk. Each die has been machined and constructed to allow for the insertion of approximately 275 needles. The needles, when precisely arranged or grouped in the die, simulate the desired character, number, or letter to be tattooed on the horse's lip.

A lip clamp or twitch is next in importance. It serves a three-fold purpose: First, it is a means of applying restraint to the animal; second, it immobilizes the horse's head to a minor degree as well as that portion to be tattooed; and third, it stretches the inside lip membrane, thereby allowing for a more even penetration of the needles and a more uniform brand. When removed, the lip returns to its normal position permitting the punctured membrane to close.

Sharing the position of importance with the lip clamp is the ink. It is of a black carbon, India drawing variety, manufactured by the Higgins Corporation.

In preparation for tattooing, identification of the animal must be first certified by the owner, trainer, or their responsible agent. In addition, the Jockey Club certificate of registration, or an official duplicate, must be presented to the representative of the Bureau in charge of the branding crew.

The preliminary step in tattooing is the examination of the horse by two of the technicians who check the age, sex, color, and markings of the horse as set forth on the Jockey Club certificate of registration. Satisfied that the horse identified by the owner or his agent is the horse described on the registration certificate, the technicians proceed with the tattooing.

In the event that there is any question of the identity of a horse, it does not receive a tattoo and the details are reported to the New York office of the Bureau for further investigation.

The Thoroughbred Racing Protective Bureau branding work sheet, all of which are numbered consecutively, is then completely filled out. The name of the horse, sex, year of foaling, the Jockey Club serial number, the tattoo branding number as it will appear after the horse has been branded, and other pertinent data are recorded. Each of the individual steps made by any one or more members of the crew is checked and rechecked by a second member to insure accuracy and to avoid possible error. The prefix letter and numbers, as they appear on the animal, are then written or chalked on a small slate which is placed in a conspicuous location in the horse's stall where each crew member can and must refer to it before each individual die is applied. The instruments are prepared and used in accordance with the following steps:

1) In the tattooing of horses, all instruments, including containers for ink and gloves used in the process, are boiled for twenty minutes submerged in water.

2) The equipment table is cleaned frequently (at least once an hour) by scrubbing with sterile gauze dipped in 70 per cent alcohol.

3) Gauze, cotton, and wooden applicators are purchased in a sterile condition. Methylate is self-sterilizing, but precaution is taken not to pollute it unduly. The branding ink is not sterile as purchased, but the method of manufacture would exclude the probability of it containing pathogenic organisms. The quart container of ink is boiled for twenty minutes when first purchased.

4) In preparation for tattooing a horse, wooden applicator, sterile cotton, sterile gauze, methylate, ink, sterile instruments, the instrument tray, instrument pan, lip twitch, alcohol, and gloves are placed on the table.

5) The tattooer puts on gloves and, in the following procedure, he is the only member of the crew permitted to touch the horse's mouth.

6) The sterile lip clamp is placed on the upper lip of the horse, the assistant technician

holding the handles of the clamp together while the groom assigned by the stable holds the horse's head as stationary as possible. The lip is wiped clean of mucus and other particles with an alcohol moistened strip of sterile gauze. It is then wiped dry with a piece of sterile gauze. The tattoo die is dipped in the ink and the brand applied. In this, the dies are picked up by the tattoer as the numbers are to appear on the horse's lip. As each individual die is removed from the pan, it is examined by the technician to insure it being the correct number. If, by accident, the ink of the die is lost or if the same number appears twice or more often on the lip, the die must be either sterilized before redipping in the ink, or the ink must be discarded and a second sterile container filled with ink and used henceforth. Errors cannot be condoned but should any occur, such as imprinting a letter upside down, the branding of the animal ceases immediately, without improvised efforts to correct it, and the case is related by telegraph to the New York office of the Thoroughbred Racing Protective Bureau which will issue instructions.

7) Even if the ink is not polluted with an unsterile die, it is changed at least once every hour.

8) After the entire number has been applied to the upper lip, the surplus ink is rubbed into the tattoo with the finger and then removed with a piece of sterile gauze. The lip is painted with methylate.

9) As instruments are used, they are placed in a special pan to avoid possible contamination of the table or other equipment.

10) All instruments for tattooing or any other purposes which are subject to pollution by ink, blood, or mucus from contact with horses are maintained in a state of cleanliness. Upon completion of the tattooing of each horse, the dies, pan, twitch, and rubber gloves that have been used are thoroughly cleaned in an aqueous detergent solution and then boiled for twenty minutes. The cleaning of dies is performed as follows:

After any use, such instruments are cleaned by being placed for a few moments in cold water, followed by a brief rinsing in Keuffel and Esser's ink-removing fluid. This is done before such instruments are sterilized, since the latter procedure may coagulate blood and make cleaning extremely difficult.

Should there be any accumulation of unsightly material, the instruments may be boiled in some household cleanser, such as oakite. Should instruments ever become unsightly by accumulation of rust, they are sent to the New York office, where the rust will be removed by a brief treatment with syrupy phosphoric acid.

Although no trouble, serious or otherwise, is expected as a direct result of the tattoo branding of these horses, the Thoroughbred Racing Protective Bureau carries insurance sufficient to cover any injury sustained by any of the horses so branded. Should any injury be given the horse, or should there be an intimation of such an impression on the part of the owner or trainer, the person in charge of the branding should immediately employ a veterinarian to attend the horse and report on his findings. The complete report should be expeditiously dispatched to the New York office of the Thoroughbred Racing Protective Bureau.

The actual branding process takes only about two minutes, and is culminated by photographing the tattoo for record purposes, and imprinting the Jockey Club certificate with a special perforating stamp.

On completion of the day's activity, the technician in charge of a crew forwards all the records, Thoroughbred Racing Protective Bureau forms and exposed film, to the New York office. Notification that the horse has been tattooed is forwarded by the New York office to the Jockey Club for posting in their records. The work sheets of the tattoo crews are filed permanently with the photographic negatives at the Bureau headquarters.

It is well to note here that a rapid check may be made of any horse tattooed, either by name, serial number as appearing in the Jockey Club certificate of registration, or tattoo brand number.

Counterfeiting, unauthorized branding, or alteration of the brand is believed impossible because the highly individualistic dies designed by, and manufactured exclusively for, the Thoroughbred Racing Protective Bureau will be retained in the careful custody of this Bureau at all times. It is anticipated that track horse identifiers will rapidly learn the characteristics of the Bureau's letters and digits so that they may immediately recognize a counterfeit or altered number. In addition, to make this further possible, a complete set of precision photographs depicting in every detail the individuality of each of the official letters and digits will be maintained at each track during the racing season by the Bureau.

It is expected that this project will require about twelve months to complete, so that on April 1, 1948, no horse 3 years old or older will be accepted for racing by a member track unless the horse has been officially tattooed, and that on and after July 1, 1948, 2-year olds will not be accepted for racing unless officially tattooed. Subsequent to 1948, it is expected that the 2-year-old crop each year will be tattoo-branded by July 1st.

General Johnson Discusses Aftosa Campaign in Mexico

"I have the deepest respect for the patriotism of the veterinarians from the United States and Mexico, who are working for the Commission. In fact, the dedication of these scientists has been a real inspiration to all of us," said General Harry H. Johnson, co-director of the joint Mexican-United States Commission in charge of the foot-and-mouth disease campaign in Mexico. General Johnson spoke to representatives of the major livestock organizations of the country at a meeting held under the auspices of the Joint Livestock Committee in Chicago on March 24, 1949.

Earlier in the day, at a press conference which an AVMA representative attended, General Johnson referred to the whole campaign as "a huge scientific experiment," which he felt "had some chance of success." Evidence that the vaccine gives only four months of protection instead of the six months hoped for was labelled by the General as the "most serious set-back to the program since the Aleman-Garza (vaccination) plan was instigated." There have been five outbreaks of the disease in areas where all animals have been vaccinated. At least one of these outbreaks occurred only forty days after vaccination. The shorter period of protection afforded by the vaccine will necessitate re-vaccinating three times a year instead of twice, as originally planned.

The magnitude of this undertaking can be illustrated by a few of the figures given by General Johnson. There are approximately 12,000,000 animals in the infected area which is about the size of the state of Texas. The largest number of animals vaccinated in one month so far has been about 1,775,000. If all animals are to be vaccinated three times a year, the vaccination rate will have to be stepped up to 3,000,000 a month. Up to now (March 24), the General said, about 8,000,000 animals have been vaccinated and about 60 per cent of the infected area has been covered once. When active cases of the disease are discovered, the infected animals and those in immediate contact are slaughtered and buried. About 6,000 animals have been killed since Jan. 1, 1949. The over-all mortality has been about 5 per cent, and the disease has reduced the herd efficiency about 50 per cent.

"The wonderful spirit of coöperation between the North American workers and the Mexicans is the result of the fine attitude of the veterinarians and the other workers. There has been no friction during the last ten months. The killing which occurred on January 31 was the work of the subversive elements. Our people just won't let problems come up," said General Johnson.

In summarizing the chances for a successful conclusion to the campaign, he said, "In about three months all the animals in the infected area will have been vaccinated once. The second tour of vaccination has already started. If the incidence of infection on the second tour is much less than it was on the first, we will feel that we have a good chance to succeed."

Morbidity and Mortality Statistics of Domestic Animals*

Reliable morbidity and mortality statistics of domestic animals are unavailable. The veterinarian is required to report certain communicable diseases, but reporting is uncertain and enforcement difficult. The incidence of numerous other diseases is entirely unknown—diseases of great economic importance as well as diseases which may be transmitted to man. The United States Livestock Sanitary Association, the American Veterinary Medical Association, and the Division of Biology and Agriculture of the National Research Council have interested themselves in the problem, with the hope that proper legislation may be enacted to correct the situation. The United States Bureau of Animal Industry is cognizant of the need but has neither the funds nor the personnel to initiate the program. The consensus seems to favor compulsory reporting to the office of the state livestock disease control official and thence to the United States Bureau of Animal Industry, with possibly the establishment of a new division of vital statistics.[1] Numerous problems must be solved before the project can be functionally effective. Manuals on nomenclature and on standard methods of diagnosis are in process of preparation but are not yet available. Experiments in the collection of morbidity and mortality data of farm animals have been made in a small way, and should be continued. The shortage of veterinary pathologists will require some years to remedy. The seriousness of the problem, however from both the economic and the public health point of view, as well as the possible rôle that infectious diseases of animals might play in biologic warfare, calls for serious attention.

*Reprint of an editorial in the *Journal of the American Medical Association*, Nov. 27, 1948.

[1]Schroeder, C. R., Buzzell, F. G., Foote, R. E. Good, G. H., Hurt, L. M., Newton, R. C., and Schneider, A. P.: Report of the Committee on Morbidity and Mortality Statistics. Proc. U. S. Livestock and Sanitary A., Dec., 1947: 228-238.

The Use of Poultry Diagnostic Laboratories

E. E. JONES, D.V.M.

Los Angeles, California

THE SCIENTIFIC methods used in the breeding and raising of livestock is a striking example of the rapid progress which is being made in all agricultural production. With intensive and accelerated production, close confinement, and more animal units per acre, greater problems of nutrition, housing, sanitation, and disease confront the livestock grower. The success of the industry is dependent, to a considerable degree, upon its ability to handle these problems successfully. Some diseases are caused by, or associated with, faulty breeding, inadequate nutrition, and other errors in management, while others are caused by specific parasitic or infectious agents. Prompt and accurate diagnosis is necessary for the application of successful corrective measures.

Poultry production has changed from a backyard farming sideline to a highly commercialized business. It has increased more rapidly and become more intensified than any other livestock enterprise. As a result, diseases have become a serious problem, often endangering the entire industry.

LABORATORIES IN CALIFORNIA

Poultry producers in California are familiar with poultry diseases, yet they depend a great deal upon laboratory diagnosis and advice. Through their efforts and financial help, several poultry disease laboratories have been established in the state to satisfy the need for a place where diagnoses and recommendations can be obtained. Detailed microscopic, bacteriologic, and animal inoculation studies are routine, and a limited number of trials are made on poultry ranches. These laboratories are supported by the State Department of Agriculture and are under the Bureau of Livestock Disease Control. Diseases of all animals are dealt with at the animal disease laboratory in Sacramento, but poultry disease problems constitute a large portion of the work there. Another laboratory in Sacramento, supervised by the Bureau but financed for the most part by the poultry industry, is maintained for the purpose of conducting agglutination tests for pullorum disease. The laboratory at Petaluma is located in a concentrated poultry district and handles poultry disease problems only. The Los Angeles laboratory was established and partly financed by the poultry industry to study poultry diseases. A new building is being constructed so all livestock diseases may be given consideration. Within the past year, the fifth poultry laboratory was opened at Turlock; another for poultry and animal diseases is being planned for Fresno. In addition to these laboratories, the University of California at Berkeley and Davis accepts a limited number of cases, and the San Diego County Livestock Department does a considerable amount of poultry work in that county.

The housing facilities of some of these laboratories are not entirely suitable, but, in general, they are adequately equipped for the common diagnostic and animal test procedures. The personnel of each laboratory includes two or three veterinarians, a laboratory technician, assistants, and office help, all of whom have qualified for their respective positions by education, experience, and competitive state civil service examinations.

The official state agency for the California-U. S. Poultry and Turkey Improvement Plans is the Poultry Improvement Advisory Board, an industry board under the general supervision of the state director of agriculture. The Bureau of Livestock Disease Control supervises the disease phase of the program through the laboratories.

As evidence of the amount of diagnostic work conducted, the records for 1943-1948 show there were 32,523 cases of poultry disease submitted to the three state laboratories, and 80,543 birds examined; at Los Angeles, where flock-owner records are kept, diagnostic examinations were made in approximately 4,500 flocks; and there were more than 4,000,000 tests conducted in the two laboratories where agglutination tests for pullorum disease are made.

The records kept in the state laboratories in California are valuable from the standpoint of the incidence of poultry diseases, but morbidity and mortality studies are not being made. The monthly and annual reports of each laboratory are typed, and summaries of the annual reports are published in *The Bulletin*, Department of Agri-

From the Division of Animal Industry, California State Department of Agriculture, Poultry Pathological Laboratory, Los Angeles.

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culture, State of California. They are not given wide publicity and are used but little for statistical purposes.

As indicated, most of the requests for help are from poultrymen who either send specimens or bring them to the laboratory personally. Several of the hatcheries and most of the feed companies employ service men who take much of the responsibility for the health of flocks, and often submit the specimens for poultrymen. A few veterinarians in California are specializing in poultry practice. Most practitioners in the state, however, are fully occupied with other work and generally are not called upon by poultry raisers.

THE LABORATORY AND THE PRACTITIONER

Laboratory findings must be properly interpreted and applied to be of maximum usefulness. While poultrymen are apt to rely entirely upon laboratory results, veterinarians should be in a better position to know the limitations of the laboratory and to use the findings as an aid toward a correct diagnosis. The full value of diagnostic service is dependent upon the coöperative efforts of the laboratory staff, the practitioner, and the poultryman.

Committees of the U.S. Livestock Sanitary Association on miscellaneous transmissible diseases in 1945 and 1946 made specific recommendations with regard to the establishment of diagnostic laboratories and the systematic reporting of statistical data, particularly on morbidity and mortality. California should be able to contribute to such a program rather easily.

A reasonable expansion of existing diagnostic facilities and the establishment of new laboratories is needed in many sections throughout the country. They should be strategically located near the poultry industry and good transportation should be available. Numerous small ones which are inadequately housed, financed, and staffed would be unsatisfactory for the poultry industry and to those responsible for their operation.

Poultrymen are able to keep informed by the University Extension Service, research station reports, diagnostic laboratory findings, and through the educational activities of the farm papers and poultry organizations. The newer information appearing in the scientific literature presents a constant challenge to the laboratory personnel to study these developments and apply them to ranch conditions.

Veterinary practitioners have the training and sound judgment to determine if poor ranch management is responsible for mortality or if there is evidence of an infectious disease. Laboratory tests are required to diagnose some of the poultry diseases, while postmortem and microscopic observations are sufficient in others. Laboratories are available where assistance may be obtained in making an accurate and prompt diagnosis, and veterinarians should make frequent use of them.

A large percentage of poultrymen in California routinely vaccinate their flocks against fowlpox and infectious laryngotracheitis. Recently, avian pneumoencephalitis (Newcastle disease) live virus vaccines have been released and are being widely used. Most chicken- and turkey-breeding flocks are bled and tested for pullorum disease. Vaccinating and blood-testing work should be under the direct supervision of veterinarians.

A competent and skillful veterinary service in the administration of drug treatments, preventive vaccination, and planned eradication programs would be of great value to the poultry industry. To render the best service, practitioners should make free use of diagnostic laboratories and cooperate closely with the veterinary staffs.

Rabies Virus in the Blood

Rabies virus inoculated into chicken embryos becomes distributed throughout the embryo's tissues without showing any affinity for the central nervous system (Abstr., *J. Am.M.A.*, Feb. 19, 1949). Although the finding does not signify that the blood of mammals is infective, it does show that the blood spreads the virus in the body, contrary to prevailing beliefs. The virus was found in the blood of chicken embryos from three to fifteen days after inoculation.

As a result of advertising campaigns, many farmers rely on mineral supplementations of cobalt as a remedly for debility. Other more important causes of debility pass undiagnosed. Many claims as to effects other than debility resulting from cobalt deficiency are without scientific foundation.—*Vet. Rec., Feb., 1949.*

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SURGERY & OBSTETRICS

AND PROBLEMS OF BREEDING

Anesthesia and Restraint of Large Animals

W. M. COFFEE, D.V.M.

LaCenter, Kentucky

IN OUR practice, we have used all types of anesthetics and restraints. In this presentation, only the types which we have found to be better for the rural practitioner will be discussed. In choosing the anesthetic, we always take into consideration: results, ease of administration, and cost.

The secret of success in anesthetizing lies in preparation of the animal by dieting for twelve to twenty-four hours and checking to be sure there are no contraindications, such as heart disturbances, etc.

The anesthetic of choice for most major operations on cattle and horses is chloral hydrate, commonly called chloral. This drug has been used as a somnifacient since 1869 and is the "knock-out drop" or "Micky Finn" of the underworld.

We prefer chloral because of the ease with which an intrajugular injection may be accomplished as compared with, for example, ether inhalation. Another factor in favor of chloral is the cost. A horse can be anesthetized for an average of 15 cents per animal. At times, it may be desirable to administer the drug *per os*. If so, because of the rapid absorption of chloral, the dosage is the same as that used in intravenous injections and may be given by capsule or stomach tube.

RESTRAINT OF HORSES AND CATTLE

The safe dosage for a 1,000-lb. horse is up to 2 oz. We usually dissolve 2 oz. of chloral in 500 cc. of H_2O and slowly inject intrajugularly until the desired stage of anesthesia is reached. The nystagmus movement of the eye denotes complete anesthesia.

Chloral has a depressive action on the medulla oblongata, which in turn causes a lowering of the respiratory and pulse rate.

The addition of magnesium sulfate ($MgSO_4$) to the chloral solution used intravenously gives the following advantages: hypnosis is reached quicker and with less struggling; the respiratory center is depressed less; there is less toxic after-effect; and the time of hypnosis is lengthened. We find that 1½ oz. of chloral and ½ oz. of $MgSO_4$ dissolved in 500 cc. of H_2O makes the desired stock solution.

Our method of anesthetizing and restraining a horse for farm surgery is: Place a twitch on the nose; put casting harness in place; give chloral until the animal begins to stagger; cast and tie; finish giving chloral until anesthesia is complete. When the casting harness is ready to draw and tie as the animal goes down, there is less danger of injuries from falls and struggling.

Of course, there are times when an operating table seems to be the only answer to securing an animal for certain operations; however, our choice for everyday use at the clinic is the stocks with a four-point sling attachment. This keeps the animal from going down in the stocks if more chloral is given than it can take and remain standing. The sling attachment is constructed with an overhead beam, parallel with the stocks, with several rings for the hooking of two self-locking, ⅝-in. double blocks. A 1-in. cotton rope, 6 ft. long, with a loop or ring in each end, put around each leg and hooked in the pulley over-head, will suspend the animal's weight and keep it in a standing position or it can be elevated to any position desired by the use of the block and line. When a cow is suspended in this manner, it is practically helpless. This sling attachment is an ideal and quick restraint for cattle for spaying and other similar operations.

When minor restraint is needed, our first thought is of the nose twitch. Most of the commercial houses sell the Yorkshire twitch, or one can easily be made from a small length of discarded obstetric chain. If the twitch does not supply sufficient restraint, the addition of a knee strap to support one front leg may do the job. Alternate for the knee strap is the side line, which is

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just a lariat looped around the fetlock of a rear leg, carried between the forelegs, on over the withers, and pulled until the rear foot is lifted clear of the ground.

When animals are so unruly that these minor restraint methods have little effect, casting harness and anesthetics are used.

We are sometimes called on to castrate outlaw animals (especially mules). In these cases, we throw a lariat over the head and allow the animal to choke himself down. When he goes down, we are ready with draw halters with chloroform bag attached. We then place in the bag a sponge saturated with choloroform, so that the first inhalation will get the full benefit of the anesthetic. Snub the draw halter to a post and release the lariat choke line and use it as a side line, flexing the top rear leg, and proceed to castrate.

We do many minor operations, when only a local anesthetic is indicated, with the use of procaine, either as a nerve block, infiltration, or epidural.

We always use an epidural injection when removing a retained placenta. This not only lightens our work, but it also makes a favorable impression on the client, because the animal is relaxed and does not strain. If the epidural is administered as the first act upon arrival, by the time the obstetric sleeve is on and you are ready to begin removing the placenta, the animal will in most cases be anesthetized sufficiently to stand. We use 5 to 15 cc. of 2 per cent procaine, depending on the size and breed of the animal, injected into the epidural space between the last lumbar and first coccygeal vertebrae.

We also use an epidural plus paralumbar block and infiltration when performing a cesarean section on a cow. In this manner, the animal can be kept on its feet, and the escape of uterine fluids into the abdominal cavity is more easily controlled. If the animal is for some reason unable to stand, we increase the epidural to 30 cc. and forget the paralumbar block and infiltration. For the infiltration, we use a 10-cc. syringe with a 2½-in., 18-gauge needle and inject 1 to 2 cc. at eight or ten sites. Several 1-cc. injections should be made subcutaneously along the line of incision and deeper injections, especially to the peritoneal region. Ten minutes should elapse between time of injections and incision.

In cattle practice, the nose leader is probably the most frequently used restraint. We think the "reef" is the most effective of the simple methods. This is formed by tying the animal's head to a stationary object, passing the rope down the neck to the withers, then around the thorax to form a loop, on down the back to a point just anterior to the hips, and around the abdomen to form another loop. By pulling the loose end, one man can throw and hold down a large animal.

For taking blood samples, dehorning, etc., a chute with neck squeeze is helpful. We often inject procaine around the cornual nerve to form a block for dehorning. Although the average farmer doesn't appreciate or demand this, some of our clients would not even consider having their animals dehorned without a "nerve block."

For cows that kick while examinations are being made or minor operations are being performed on the udder or teats, a leather strap with buckle may be drawn tightly around the leg opposite the operator. This strap, placed just above the hock, applies pressure to the superficial digital flexor and will prevent many hard kicks. The cow's tail raised in a vertical position with pressure will also aid in preventing kicks.

SWINE RESTRAINT

There is very little practical restraint for swine other than the hog holder and lariat snub. Nembutal is the anesthetic of choice for small swine. We use this for scrotal and umbilical hernias, removal of scirrhous cords, prolapse of the rectum, intestinal anastomosis, etc. We use 7 to 10 cc. of nembutal as a sedative for cesarean section on sows. The operative site is infiltrated with procaine.

For major operations on large sows and boars, where price of anesthetic is to be considered, we prefer to use chloral hydrate, because a large boar can be completely anesthetized for only 9 cents. This is quite a saving compared with the cost of pentobarbital sodium. We make our chloral solution by dissolving 1 oz. of chloral in 250 cc. of H_2O.

To anesthetize a large boar or sow, we first snub him close to a stationary object, place a small rubber band around the ear to block and raise the marginal ear vein. The easiest way to make sure the needle is in the vein is by the use of a glass syringe to aspirate a few cubic centimeters of blood. Then the syringe and rubber band are removed and the intravenous set attached to the needle. (If you forget to remove the rubber band, the client may come back in a week showing various degrees of irritation, and want to know if there is any extra charge for removing the ear.) To safely inject the chloral, a slow, steady flow is necessary. This is best controlled by the use of a 20-gauge needle and elevation of the intravenous set to 2 to 2½ ft. above the

animal's head. Continue the flow until the animal goes down, and there is no reflex action when the nose is pinched with a rat-toothed forceps.

After all general anesthetics with chloral, we administer a dose of caffeine sodibenzoate and prefer to give half the dose intravenously and half subcutaneously. This is not only a cardiac and respiratory stimulant but a diuretic, which aids in the elimination of chloral. It is also an antidote for chloral.

Pseudomonas Aeruginosa from an Aborted Equine Fetus

On a recent postmortem examination of an equine fetus* aborted at 8 months of pregnancy, it was observed that the specimen showed extensive autolysis and had an unusually sour putrefactive odor. It was estimated that it had died one to three days before being expelled. The dam had been transported by van to the farm where the abortion occurred ten days previous to the event. Upon arrival, the mare was very nervous, but became quiet after being placed in a stall and appeared to be normal within twelve hours.

Bacteriologic examination of the fetus revealed *Pseudomonas aeruginosa* in the lungs, stomach contents, liver, spleen, and heart blood. The microörganism was a motile gram-negative rod. It did not produce H_2S, form indol, or ferment glucose, lactose, or sucrose. It produced pyocyanin when grown on ordinary culture medium. The bluish green color was especially strong in sucrose broth and, upon adding a small amount of chloroform to the culture, shaking, and allowing to settle, a deep blue color appeared in the chloroform.

During the past twenty-eight years, postmortem examinations were made on 1,301 aborted equine fetuses. From approximately 22 per cent of these fetuses, microörganisms were isolated that apparently were involved in the abortions. Streptococci accounted for 17 per cent of the abortions, *Salmonella abortivo-equina* for 2 per cent, and *Escherichia coli*, staphylococci, *Shigella equuli*, *Corynebacterium equi*, diphtheroids, and sarcina each were isolated from less than 1 per cent of the cases.

Pseudomonas aeruginosa was observed for the first time by members of the Department of Animal Pathology (Kentucky Agricultural Experiment Station) in an equine abortion in 1944. It was isolated from a fetus that was aborted during the seventh month of pregnancy. The fetus had been dead for several days before abortion.

This microörganism occurs infrequently in genital infection of mares. Once established in the uterus of the mare, it is difficult to eliminate and mares infected with this bacterium usually fail to conceive. It is not known whether these two abortions resulted from uterine infection present at the time of breeding or from invasion of the uterus in the later stages of pregnancy. The finding of *Ps. aeruginosa* in equine fetuses is of interest since it usually is not considered to be a cause of abortion in mares.—*E. R. Doll, D.V.M., D. W. Bruner, D.V.M., Ph.D., and Alice S. Kinkaid, B.S., Department Animal Pathology, Kentucky Agricultural Experiment Station, Lexington, Ky.*

*The investigation reported in this paper is in connection with a project of the Kentucky Agricultural Experiment Station and is published by permission of the director.

Problems of Breeding

The lay inseminator should be trained to insist on a veterinary examination of cows unsuccessfully bred two or three times.

• • •

It is difficult, if not impossible, to induce estrus in a cow that is on a marginal basis of ketosis.

• • •

The diagnosis of pregnancy in dairy cattle by the manual exploration of the reproductive organs per rectum still is magic to the average milker.

• • •

Infectious granular or nodular vaginitis is a major factor in breeding unsoundness of heifers.—*J. W. Cunkelman, Iowa.*

Pantothenic Acid in Trichomoniasis.—Although four analogues of pantothenic acid in high dilution were shown to be lethal to *Trichomonas vaginalis*, *Trichomonas foetus*, and *Trichomonas gallinae* in culture mediums, results obtained *in vivo* were unsuccessful owing, it was believed, to the counter-action of vaginal fluids. The finding was an example of the unreliability of *in vitro* tests of microbicides.—*Biol. Abstr., Sec. E, Nov., 1948.*

Trichomoniasis Diagnosis.—The vaginal secretion of infected cows has the power to agglutinate Trichomonas and thus permits the animal to rid itself of the parasite and to resist reinfection. Aside from the theoretic interest in the phenomenon, it affords a means of diagnosis and has the advantage of being specific and easy to execute.—*Abstr. Archiva Medica Belgica, 3, (1948): 117.*

Procedures for Diagnosing Bovine Venereal Trichomoniasis and Handling Affected Herds

DAVID E. BARTLETT, D.V.M.

Beltsville, Maryland

SINCE bovine venereal trichomoniasis was first described as a distinct entity twenty years ago, our understanding of it has grown considerably. As a result of the researches of many workers in both laboratory and field, the precise nature of this infection has been determined, and diagnostic methods and means of handling infected herds have been developed and improved. Numerous procedures considered to be of potential value have been subjected to experimental trial, evaluated, and accepted or discarded.

It is the purpose of this paper to assemble that part of our present knowledge of bovine venereal trichomoniasis needed by veterinarians when called upon to cope with this disease. However, in order that the rationale of the suggested procedures may be judged, the experimental evidence supporting each procedure is briefly presented. Admittedly, our knowledge of bovine venereal trichomoniasis is still incomplete, but experience has established one general fact, namely, that the handling of trichomonad-infected herds is a laborious, long-term, expensive undertaking and requires, for success, the utmost coöperation and understanding between the herd owner and the veterinarian in attendance.

DESCRIPTION

Pathogenesis and Pathology.—Bovine venereal trichomoniasis is caused by the pathogenic, flagellate protozoon, *Trichomonas foetus*. It occurs naturally only in cattle and is transmitted ordinarily only at coitus. However, mechanical transfer can occur readily through artificial insemination with semen from infected bulls as well as through genital examinations by a careless operator. Isolated incidents of supposed nonvenereal transmission of trichomoniasis occurring under natural conditions have been reported. Our observations, however, have indicated that such cases, if they occur, are exceedingly rare and our experiences have shown that under practical conditions nonvenereal transmission needs no consideration.

The disease is invariably a herd or breeding unit problem. It cannot occur sporadically in either individual females or bulls. If an infected bull is in service, he is infecting most of those susceptible females with which he has coitus. Likewise, presence of an infected female in a herd is indication that an infected bull is in service, and that other infected females have been, are, or will be present. The only exceptions possible are animals recently added to a herd, or those exposed through natural "outside" service or through artificial insemination with semen from an outside source. Such infected animals must properly be considered members of other breeding units.

In bulls, *T. foetus* ordinarily live only on the surface of the penile and preputial membranes, produce no symptoms of infection significant in diagnosis, and, ordinarily, affect neither his functional fertility nor, appreciably, his potency. Bulls remain permanently infected, transferring *T. foetus* at practically every coitus.

Trichomoniasis in bulls does not alter the probability of their initiating pregnancies in uninfected females. However, should infection develop in an exposed, susceptible female in which a pregnancy has been initiated, the conceptus is usually killed, the time of its death largely governing the specific symptoms produced.

In females, the uterus is the principal and persistent site of infection. The vagina apparently develops a local immunity as a result of its short initial parasitic attack, subsequently playing only a passive inconsequential rôle in the progress of the disease in the affected female, and providing a relatively unreliable source of *T. foetus* for diagnosis. Epizoötiologically, however, the vagina's rôle is very important, as this organ harbors *T. foetus* during infection at the time of estrus and furnishes at coitus the place of contact for bulls. Vaginal immunity is responsible for the rapid disappearance from the vagina of trichomonad organisms originating from the uterus, where the infection persists. Later, when the uterus likewise becomes resistant to *T. foetus*, the infection is terminated.

The majority of females experiencing initial infections return to estrus within three to five weeks postcoitus, indicating either very early termination of pregnancy or failure to become

From the Zoölogical Division, Bureau of Animal Industry, Agricultural Research Administration, U. S. Department of Agriculture, Beltsville, Md. Dr. Bartlett is now at the School of Veterinary Medicine, University of Minnesota, St. Paul.

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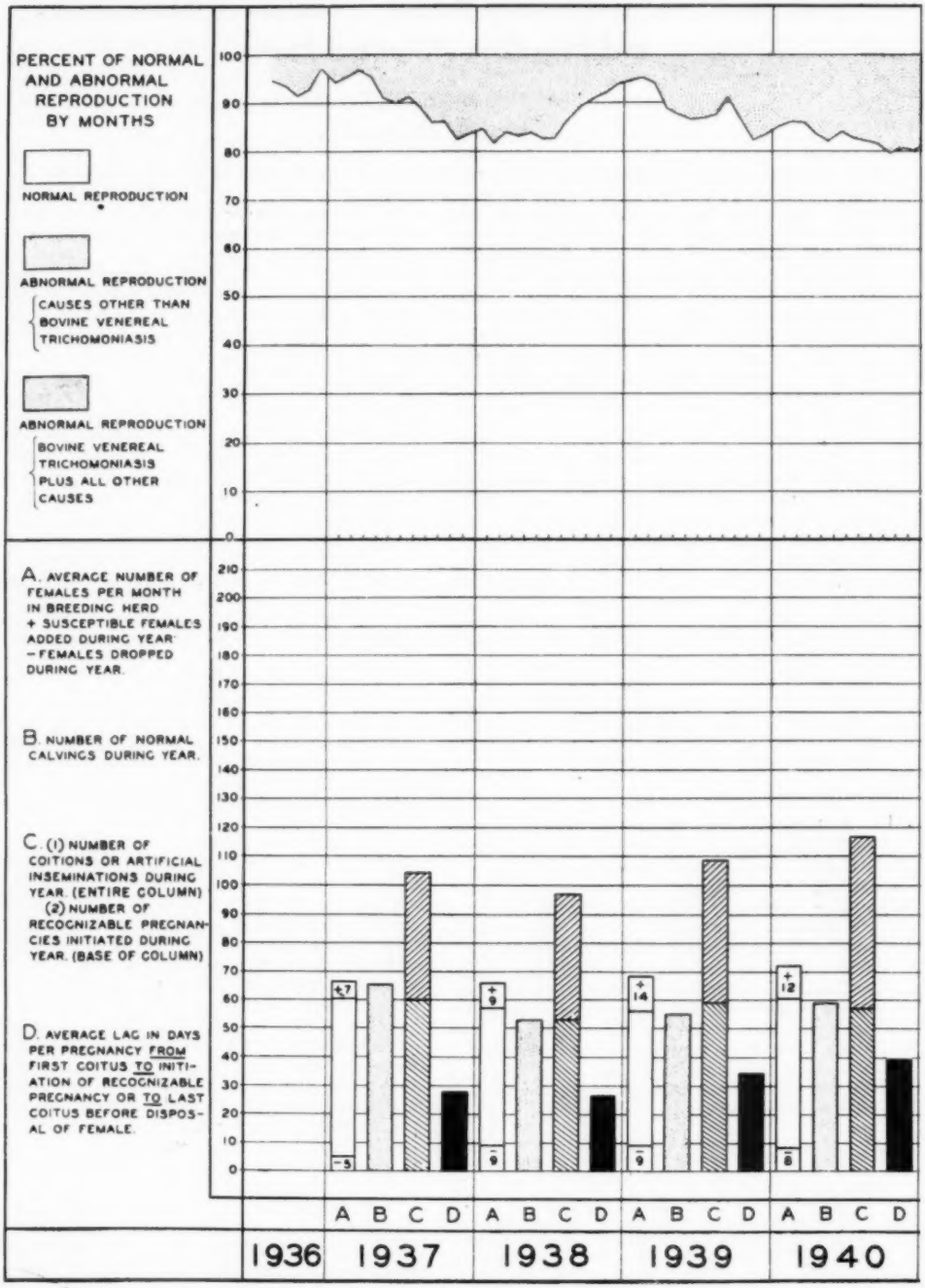
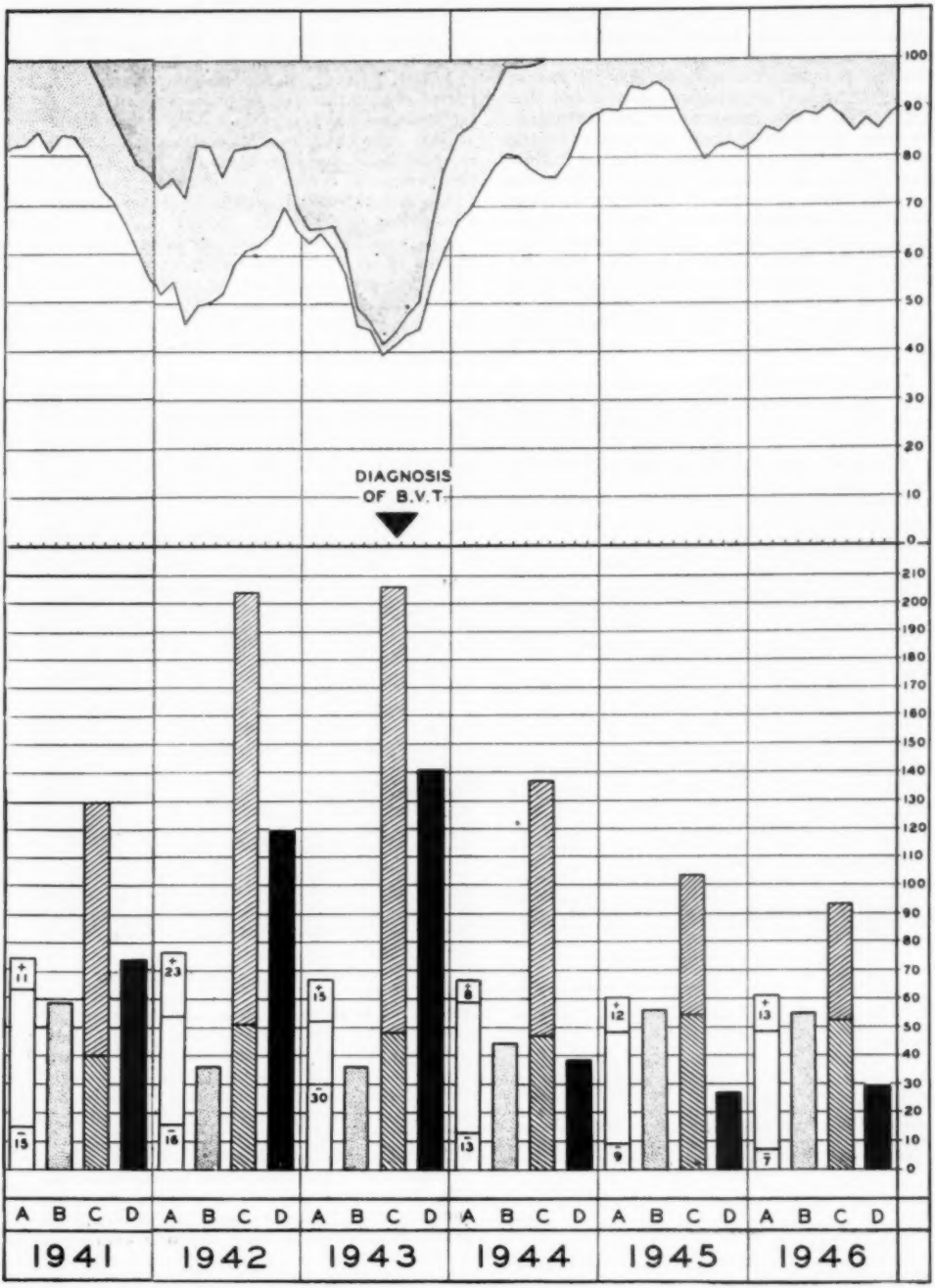


Fig. 1—Ten-year summary



of reproduction in herd A.

—From *American Journal of Veterinary Research*

fertilized. A catarrhal trichomonad endometritis then persists up to five or six months, the estrous cycle being essentially regular, and a state of temporary infertility existing. In some females, the conceptus may develop for two or, rarely, three or four months before it is killed. Such females either resume cyclical estrus subsequent to aborting their conceptus or discharging it liquefied as pus, or, should the corpus luteum of pregnancy persist, they may develop frank pyometra of indefinite duration. Previously infected females tend, on reinfection, toward the latter types of cases, their pregnancies advancing further before being terminated. Occasionally, pregnancies have been observed to proceed apparently unaffected despite infection; also, appearance of *T. foetus* during the postpartum period has been reported.

Most recovered females are resistant to reinfection for one to several years and may reproduce normally from coitus with infected bulls. However, in individual females, the duration of this immune period is unpredictable. Immunity is not developed as a female grows older as was once thought to be the case, previously uninfected aged cows being at least as susceptible as virgin heifers.

Genital discharges in trichomoniasis are uterine in origin and may occur irregularly from those females in which time and circumstances have permitted considerable quantities of pus to accumulate. Such cases are relatively infrequent among infected females. Appreciable quantities of pus may be discharged at the time of trichomonad abortion. Also, in females with frank trichomonad pyometra, some discharge may be noted every few days, particularly at the time of sudden changes in intra-abdominal tension, such as in getting up, lying down, defecation, and micturition.

TABLE I—Occurrence of Trichomonas Foetus in 800 Preputial Samples Collected Weekly from Trichomonad-Infected Bulls*

Bull (No.)	Samples containing *T. foetus*	
	Ratio	Per Cent
Typical bulls		
214**	49:57	85.96
207	168:199	84.92
208	93:116	80.17
208**	54:68	79.26
193	52:66	78.80
274	60:91	65.98
214	10:16	62.50
275	31:51	60.78
250	11:22	50.00
266	11:26	42.30
Atypical bulls		
218	8:41	19.50
261	4:47	8.51

**Second infection.

*Taken from a previous publication by Bartlett, Hasson, and Tester.[2]

Trichomonad pyometra and trichomonad discharges are never postpartum occurrences; they are always preceded several weeks or months by coitus. Trichomonad pus is thin to mucoid, yellowish to gray, and never putrescent. Reported observations by early workers of severe trichomonad-vulvovaginitis within a few hours or days subsequent to coitus with trichomonad-infected bulls are erroneous. In fact, vaginal response to *T. foetus* is surprisingly moderate and is not ordinarily sufficiently characteristic to consider in diagnosis.

It is possible that variations in virulence of strains of *T. foetus* may exist and that such variations may be reflected in altered symptomatology. Strains that require longer in developing their populations would obviously tend to produce more recognizable abortions and instances of pyometra.

Since, for females, no chemotherapeutic measures capable of interrupting the course of infection have been developed, it is logical to take advantage of the self-limiting nature of this disease and accomplish eradication by a systematic scheme of controlled breeding practices. This is necessarily based on understanding of the maximum persistence of infection in females. Study of experimentally infected heifers and cows and of infected field herds has established the premise that subsequent to (1) completion of a normal pregnancy; (2) passing two estrous periods; and (3) resting at least ninety days postpartum, previously infected females may be safely permitted coitus at their third or subsequent estrous periods with uninfected bulls.[1] One contrary report exists in the literature of infection persisting in a female several years and through two apparently normal pregnancies before termination of a third pregnancy and abortion.[3] Such an occurrence has not been observed by any other worker. This report should be kept in mind while proceeding for the present on the practical premise described.

Symptomatology of Importance in Diagnosis.—Herds experiencing reproductive failures should be suspected of *T. foetus* infection (1) when most females require several services before becoming recognizably pregnant, as would be the case in newly infected herds, or when this is true of heifers and few cows, as would be the case in herds with long-standing infection; (2) when the intervals between calvings are found in many otherwise apparently normal females to be markedly extended despite regular service; (3) when unexpected return to estrus of females thought pregnant is a relatively common occurrence; and (4) when, in addition to the foregoing, instances of the less frequently occurring, but more dramatic, symptoms of trichomoniasis are observed in some females, such as early abortion, occasional discharges from the genitals of odorless mucoid pus, particularly when lying down, and known

instances of postcoitus (not postpartum) pyometra.

It is exceedingly unfortunate that these last symptoms are so often erroneously considered as the major occurrences characterizing trichomoniasis. Actually, their importance in the total picture, as viewed by herd managers and by veterinary practitioners, may be relatively minor. In some herds, their occurrence may never be noted.

Effect of Trichomoniasis upon a Herd.—Figure 1 shows the reproductive performance of a typical dairy herd over a ten-year period. During this period, a trichomoniasis outbreak occurred which after about two years was recognized and remedial measures were instituted. The disastrous effects of trichomoniasis upon the economy of this herd are evident.

DIAGNOSIS

Exploration of the immunologic reactions of the bovine animal while resisting infection with *T. foetus* has not yet resulted in discovery of a sufficiently specific immunity mechanism useful as a practical, reliable diagnostic test for trichomoniasis. Furthermore, there is no symptom or syndrome pathognomonic of trichomoniasis. Other conditions still of obscure nature—probably nonspecific—may exert deleterious effects upon the reproductive capacities of cattle and produce a clinical picture which must be positively differentiated from trichomoniasis. Consequently, a herd diagnosis of bovine venereal trichomoniasis can be made only on demonstration of *T.*

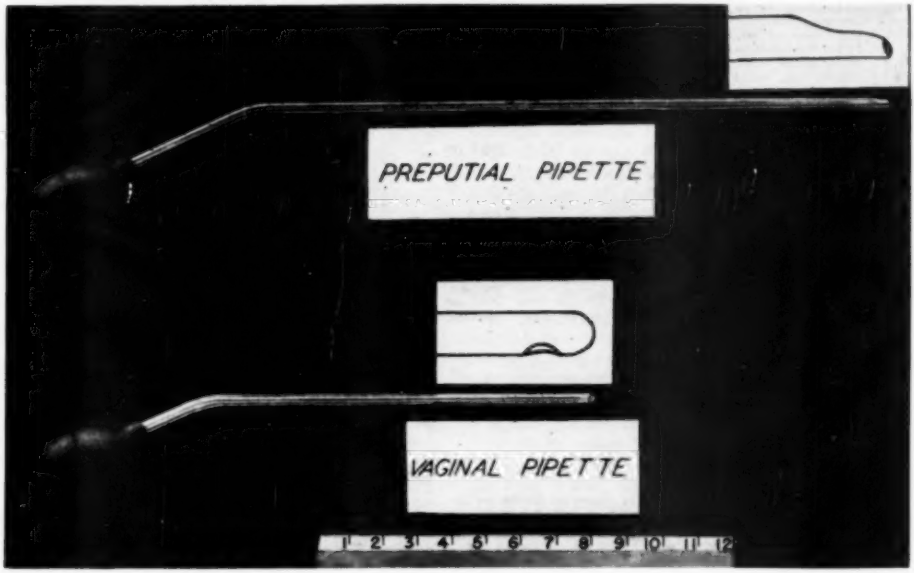


Fig. 2—Vaginal and preputial pipettes used for collection of samples to be examined for Trichomonas foetus.*

The vaginal pipettes (Andrews and Miller[8]) and the preputial pipettes are made of pyrex glass tubing (8 mm. outside diameter; 1.5 mm. *heavy wall*) with the use of a gas burner and a small acetylene torch.

Vaginal pipettes are 14 to 16 in. long and fitted with a 2-oz. rubber bulb at one end, there being a 15-degree bend in the tube 3 in. from the bulb. The other end is sealed and has a 3/16 in. hole in the side about ½ in. from the tip on the side opposite the reflex angle located near the opposite end of the tube.

Preputial pipettes are 21 in. long and fitted with a 2-oz. rubber bulb at one end, there being a 15-degree bend in the tube 3 in. from the bulb. The other end is shaped so that a blunt chisel edge is formed, the bevel being on the same side as the reflex angle located near the opposite end of the tube.

Between each use, these pipettes are thoroughly washed and rinsed, their free ends are wrapped with paper, and then they are sterilized. These pipettes are easily sterilized, inexpensive, and made of readily available materials. Although glass pipettes may occasionally break during use, such an occurrence is rare and little reason for concern. In bulls the broken piece usually will fall out of its own accord or, after a few hours, will be found readily accessible at the preputial orifice.

*The figure is taken from a previous paper by Bartlett.[10]

TABLE 2—Results of Experimental Treatment of Trichomonad-Infected Bulls*

MISCELLANEOUS CHEMICAL AGENTS

Bull No.	Agent	How Applied	Result
A99	Sodium perborate	Douche	Failure
A99	Solution A	Douche	Failure
A99	Solution A	Douche	Failure
A99°	Lugol's solution	Douche	Failure
A99	Lugol's solution	Douche	Failure
A99	Lugol's solution	Douche	Failure
193	Solution B	Douche	Failure
208	Ointment B	Ointment	Failure
208	Solution B	Douche	Failure
208	Ointment C	Ointment	Failure
208	Solution D	Douche	Failure
208	Ointment C	Ointment	Failure
208	Ointment F	Ointment	Failure
274	Ointment E	Ointment	Failure
274	Powder G	Insufflation	Failure

Agent A - sodium hypochlorite (zonite)
Agent B - sodium dioctyl sulfo-succinate (aerosol ot 100%)
Agent C - sodium ethyl mercuri thiosalicylate (merthiolate) in ointment base of high molecular weight polyethylene glycols (carbowax 1500)
Agent D - alkyl dimethyl benzyl ammonium chloride (zepheran chloride)
Agent E - 3, 6, diamino-10 methylacridinium chloride (trypaflavine neutral) in unknown ointment base
Agent F - trypaflavine in sodium salt of carboxymethyl cellulose
Agent G - argyrol 40%, kaolin 30%, and beta-lactose 30%

SODIUM IODIDE INTRAVENOUSLY (FEW EXCEPTIONS NOTED)

Bull No.	Trial One	Trial Two	Trial Three	Trial Four
289	Failure			
290	Failure			
300	Failure			
301	Failure			
302	Failure			
207	Failure	Failure		
208#	Failure	Failure[x]		
274	Failure	Failure	Failure[x]	
214#	Failure	Failure[x]	Failure[x]	
275	Failure	Failure*	Failure	Success[x]
266	Failure	Failure*	Success	
193	Success			
208	Success'			
214	Success'			
250	Success			
281	Success			
283	Success			
A##	Success			
B##	Success			

\# - Second infection
- Cases reported by Slippel et al 12/
' - Potassium iodide orally
* - Sodium iodide intravenously followed by potassium iodide orally
x - Also received daily douches during period of treatment with 0.25% chloramine-T solution

GERMAN PROPRIETARY COMPOUND - GPC[x]

Bull No.	Trial One	Trial Two
208	Failure	Failure
207	Success	
274	Success	
289	Success	
290	Success	
297	Success	
300	Success	
301	Success	
302	Success	

[x]GPC - 0.5% 3, 6 diamino-10 methylacridiniumchlorid (trypaflavine neutral) and 0.5% bis-2-methyl-4-amino-chinolyl-6-carbamid-hydrochlorid (surfen A) in a fat-free "washable" ointment base (PEG). Marketed as bovaflavin salbe.

*Douches and insufflations were administered while the bulls were confined in stocks.

Sodium iodide was administered intravenously while the bulls were confined in stocks. The most efficacious regimen of treatment was: five doses given intravenously at intervals of 48 hours, each dose consisting of 5 Gm. of sodium iodide per each 100 lb. of body weight, dissolved in 500 cc. of sterile distilled water.

[x]Data taken from previous publications by Bartlett.[8, 6]

foetus in the genital exudate from a breeding female or bull that has participated in that herd's breeding operations.

Occasionally, demonstration of *T. foetus* is a simple task—the diagnostician may even be presented with a quantity of trichomonad pus from a discharging female or with an aborted conceptus, the fluids of which teem with *T. foetus*. Ordinarily, however, the diagnostician is not so fortunate and a carefully planned search for *T. foetus* in the herd—or an equally well-planned procedure to prove its absence—must be undertaken.

Diagnosis in the Bull.[5]—Establishing the presence of infection or the freedom from infection of individual suspect bulls, particularly the former, can usually be accomplished by direct sampling techniques. However, in establishing absolute proof of freedom from infection, test coitions with known susceptible females are desirable, the test females being examined postcoitus at appropriate times. In bulls, the factor of greatest importance to accurate diagnosis is the collection of the material to be examined from the precise *source*.

In undertaking collection of samples for diagnosis in bulls, the following considerations and routines should be observed:

1) Contraindications.—A suspect bull must not have been treated intrapreputially with any chemical agent for several months previous to collecting samples. Likewise, should the genital membranes be grossly contaminated as a result of masturbation or "riding" other bulls, unsuitable samples will be obtained. Isolate the bull in a clean stall for a few days. Also, since coitus markedly depletes the accessible trichomonad population on the genital membranes, samples should not be collected for several days postcoitus.

2) Restraint.—Bulls generally offer little resistance to sampling. Ideally, they can be placed in either a stocks or chute. However, collection of samples while a bull is tied in a stall is ordinarily not difficult. With the bull's head secured, one assistant takes a "short hold" on the tail and bends it straight upward and a second assistant, facing forward, crouches at the bull's side, his inner arm over the bull's loin and his inner thigh and buttock tight against the bull's stifle and flank. It is well for the operator to pat and stroke the bull's abdomen gently before collecting the samples.

3) Equipment and Technique for Collection.—We believe that most accurate results will be obtained when samples are collected with a preputial pipette as shown in figure 2.

In collecting samples from bulls, one must keep in mind the importance of the precise *source* from which the smegma is obtained. Experimental studies of infected bulls have shown clearly the area of genital membrane harboring the relatively greatest accessible population of *T. foetus* to be as shown in figure 3.

Samples are collected by passing a pipette into the preputial cavity, scraping the surface of the glans penis and immediately adjacent preputial membrane, and then flushing the smegma obtained into a test tube containing 5 to 10 cc. of 0.85 per cent saline solution. No fluid is introduced into the preputial cavity, as introduction of fluid or swabbing will collect extraneous debris from low population areas, thereby increasing the difficulty of microscopic examination and introducing more or different bacteria which seem to shorten the life of *T. foetus* in samples.

4) Handling Samples and Technique of Examination.—*Trichomonas foetus* always occur in the bull in relatively small numbers and cannot ordinarily be located or recognized in samples unless alive and actively motile. Therefore, it is imperative that samples be properly handled after collection in order to protect the living organisms. As yet, no culture medium has been found consistently capable of increasing the population in preputial samples *in vitro*. The smegma, suspended in 0.85 per cent saline, by which a satisfactory osmotic tension is

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Footnote for Table 2 on Opposite Page

Applications of GPC and other ointments were made while bulls were in the standing position confined in stocks; no other physical restraint was necessary. It had previously been found that for successful carrying out of the procedure employed, properly designed stocks were imperative. These were strongly constructed and had stanchion bars that could be tightly clamped on the neck, preventing all forward or backward movement of the bull. The width of the stocks at the level of the pelvis was such that all lateral movement could be prevented. Twenty-eight inches was an ample width for all except the largest bulls. When treating small bulls, 2 x 4's were inserted medially to the vertical members of the stocks to take up space. A shovelful of sand was spread under the bull's hind feet to prevent slipping, the effect of the anesthetic preventing full control of the hind legs. Invariably, bulls stood with their feet further forward than natural. After the area of puncture was shaved, scrubbed, and disinfected, 15 to 20 cc. of 1% procaine with 0.1% epinephrine was injected very slowly (up to 5 minutes), between either the sacrum and first coccygeal vertebra or between the first and second coccygeal vertebrae. After twenty to thirty minutes, it was possible to cause protrusion of the glans to a position where it could be grasped and held; usually, some manipulation was necessary. After the genital membranes were thoroughly washed with soapy water, rinsed, and dried, 120 cc. GPC or other ointment was thoroughly rubbed for fifteen minutes into the surface of the glans and prepuce. When GPC was used, the urethra was injected with 15 to 20 cc. of trypaflavine solution and then the urethral orifice held for five minutes. Each GPC treatment consisted of two applications ten to fourteen days apart.

afforded, must be protected from extremes of temperature and from evaporation. *Trichomonas foetus* can not tolerate high salt concentration or drying.

Ideally, samples should be examined within a few hours of collection. In cold weather, they may be brought from the field in an inside pocket. If immediate examination is not possible, samples from bulls may be kept in a cool place up to eighteen hours in order to control growth of bacteria. The trichomonad population decreases rather rapidly, but even after eighteen hours of refrigeration at 45 F., sufficient trichomonad organisms ordinarily survive, when originally present, to make a diagnosis. Samples should be permitted to sediment for about an hour before material is taken for examination. Then, if present, *T. foetus* are concentrated in the superficial layer of the sediment. Material for examination is obtained by means of a capillary pipette from the superficial layer, drops are put on a slide until it is almost covered with a thin pool, and examination is made under low power (x100) of a microscope. Several slides should be prepared and studied before the sample is declared to be negative.

5) Interpretation of Negative Findings.—Bulls should be examined weekly for at least six weeks before considering failure to find *T. foetus* significant. As shown in table 1, *T. foetus* are not found in all preputial samples collected from infected bulls; in exceptional infected bulls, relatively long series of negative examinations may occur. If the bull's clinical history is suspicious of trichomoniasis, and *T. foetus* are not found in preputial samples, it is advisable to breed intentionally 2 or more susceptible (virgin) heifers.

Diagnosis in the Female[4].—In individual suspect females, it is frequently not possible to prove their infectiveness and never possible to prove their freedom from infection by a few examinations. It is fortunate that individual diagnoses in females are not essential, diagnosis and handling of this disease being on a herd basis.

The primary site of *T. foetus* during infection is the uterus, which is inaccessible by ordinary techniques. Diagnosis, therefore, must be based on examination of exudate from the vagina where *T. foetus* are not always present. Time of collection of samples, in relation to exposure of the female, is the factor of greatest importance in accurate diagnosis in females.

In undertaking collection of samples for diagnosis in females the following considerations and routines should be observed:

1) Equipment and Technique for Examination.—We believe that the most accurate results will be obtained when samples are collected with vaginal pipettes as shown in figure 2. The vaginal pipette containing 5 to 7 cc. of 0.85 per cent saline is introduced into the vagina, the bulb compressed several times to flush the vagina, and then the sample is withdrawn and ejected into a test tube.

2) Principles Governing Collection of Samples.—In collecting samples from females, one must keep in mind the importance of rational selection of females for examination. Haphazard sampling is a senseless procedure usually productive only of worthless, and possibly misleading, negative findings. Only in initial infections does the parasite population in the vagina follow an essentially consistent pattern. Examples of typical initial infections as determined by daily examination of vaginal samples are shown in figure 4. Typically, following a short prepatent period, the patterns of appearance of trichomonad organisms in the vagina are essentially consistent during the vaginal phase of infection which usually lasts up to about four weeks postcoitus; thereafter, the pattern is sometimes less predictable. In females that return to estrus early and continue with regular estrous cycles (181 and 212), the pattern of trichomonad fluctuations is correlated with the estrous cycles. In females with interrupted estrous cycles (238), there is no such rhythm. Should these same animals have been re-exposed at regular breedings during subsequent years, their vaginal pictures would have been unpredictable, not only because from most re-exposures no infection would have resulted, but also because true vaginal infection would not necessarily have recurred even if reinfection resulted.

3) Selection of Females.—Most accurate results are obtained when samples are collected from females twelve to nineteen days subsequent to first coitus with a trichomonad-infected bull. Thereafter, if early return to estrus occurs, examinations made a few days preceding each of the anticipated subsequent two or three estrous periods may reveal *T. foetus*, if present. In the field, it is usually not possible to be certain that an individual is previously uninfected. Therefore, heifers recently served as virgins are ordinarily selected. If study of the available breeding records of the herd fails to reveal suitable females, two or more virgin heifers may be deliberately permitted coitus with each suspect bull. Absence of *T. foetus* from the vagina twelve to nineteen days postcoitus in heifers served as virgins is reasonable evidence of their freedom from infection. Negative findings in such females indicate either that the bull was not infected or that transmission failed to occur. Allowing at least a week between coitions may help keep instances of the latter to a minimum. It has been shown that most infected bulls transmit infection to a high percentage of susceptible females. For example, in an experiment in

which 24 susceptible females were permitted coitus with infected bulls, 28 coitions resulted in infection of all 24 females.

4) Handling Samples and Techinque for Examination.—*T. foetus* occur in considerable numbers in vaginal samples collected from infected females during the specified period. The samples should be handled and examined in about the same manner as bull samples, although concentration by sedimentation is not so important. *T. foetus* survive longer in vaginal samples both at room temperature and when refrigerated.

Rarely, it might be desirable to divide a vaginal sample and add a few drops of merthiolate to one portion, in order that this preserved portion can be searched for dead trichomonads should the untreated portion be rendered unsuitable for examination by unavoidable delay.

Identification of Trichomonas Foetus.—Living *T. foetus* may be readily identified under low power of a microscope (x100) by a careful examiner of limited experience. Its size, shape, and manner of moving are very characteristic. A few hours spent in actual study of this organism as it appears in the various natural exudates is valuable experience. One only need know specifically *T. foetus;* any other Protozoa found are irrelevant contaminants.

Contaminant Protozoa are infrequent if samples are collected meticulously with sterile equipment of the design described herein and examined within a few hours of collection. Precluding, in so far as possible, the picking up of contaminant Protozoa and then not permitting time for their multiplication, simplify the final step of microscopic examination.

HANDLING THE INFECTED HERD

That it is unprofitable to "live with" trichomoniasis is clearly shown by the disastrous state evident in herds in which *T. foetus* are present. It is true, however, that its effects can be minimized somewhat by a system of breeding in which the services of infected bulls are rigidly restricted to previously infected females, thus taking advantage of the relative state of active resistance existing in most females subsequent to their infection. But this scheme has disqualifying practical disadvantages: (1) The maintenance of two distinct breeding units is necessary; (2) a constantly dangerous reservoir of infection remains in the herd; and (3) if prac-

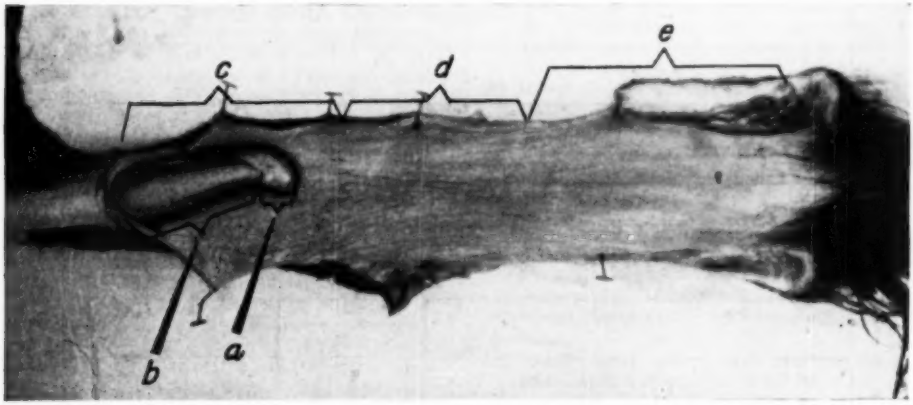


Fig. 3—Distribution of Trichomonas foetus on the genital membranes of bulls.*

Average number of *T. foetus* per cc. in scrapings from designated areas taken at monthly intervals from genital membranes of trichomonad-infected bulls.

Area	Bull 208 Average of 5 scrapings	Bull 207 Average of 5 scrapings	Bull 214 Average of 4 scrapings	Average of all scrapings
A	1,720	224	350	744
B	27,626	582	725	9,529
C	4,424	204	220	1,601
D	616	236	15	288
E	1,514	140	22	557

*Figure and tabular material taken from a previous publication by Hammond and Bartlett.[10]

ticed for several years, most females become reinfected and experience further periods of infertility. In females, amelioration through immunization procedures has shown no promise. Also, chemotherapeutic measures have been found ineffective in altering the course of infection.

Complete eradication of the disease from affected herds is the only effective means of handling this condition; ultimately, it is the most economical. Eradication involves steps as follows: (1) recognizing trichomonad-infected bulls and promptly withdrawing them from service (ideally, sub-

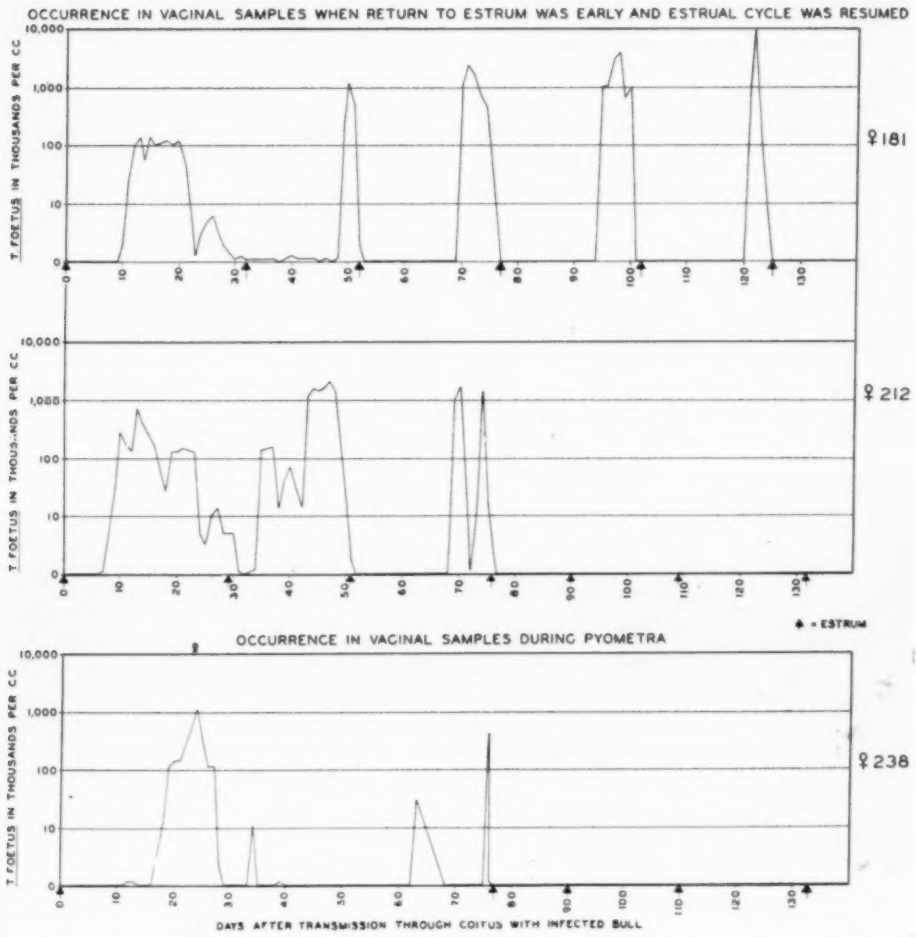


Fig. 4—Fluctuations in populations of Trichomonas foetus in the bovine vagina during initial infection.*

Heifers recently served as virgins are the best subjects for examination for *T. foetus* by vaginal sampling. It is recommended that examination of such females be made either (a) 12 to 19 days postcoitus or, as a second choice, if early return to estrus occurs, (b) a few days preceding any of their anticipated subsequent two or three estrous periods. Females 181 and 212 illustrate this schedule very clearly. Female 238 is the only exception in a series of more than 20 initial infections studied. She is somewhat atypical, in that her patent rise which began on the twelfth day was slower than others. Negative samples occurred on the fourteenth and fifteenth days and no examination was made on the sixteenth day. On the seventeenth day, and subsequently, *T. foetus* was found.

*Taken from previous publications by Hammond and Bartlett[9] and Bartlett.[10]

sequent to successful treatment, the previously infected valuable bulls are restored to service); (2) maintaining a constructive breeding program for all females in the herd, regardless of their status, and systematically breeding each potentially infected female when she becomes free of infection, and preventing her re-exposure.

Treatment of trichomonad-infected bulls is still on an experimental basis. Numerous procedures and materials have been studied, but only two methods subjected to limited but carefully controlled experimental trials conducted at the Zoölogical Division at Beltsville, Md., have shown promise. These are : (1) intravenous administration of large doses of sodium iodide; and (2) topical application of a German-developed proprietary compound. The work of others has been reviewed, and details of our progress to date with experimental treatments for trichomonad-infected bulls have been reported elsewhere.[5,6] Results of all our treatment experiments conducted to date are summarized in table 2.

While encouraging, our research has not yet progressed to a point where treatment of trichomonad-infected bulls can be recommended for general field use. Also, it must be understood that treatment of bulls is an exacting, lengthy, costly procedure requiring frequent handling and observation of the subject over a period of six months by a veterinarian familiar with trichomoniasis. Under practical field conditions, infected bulls not of exceptional value as sires (at least 3 times their salvage value) should be promptly slaughtered.

A system of hygienic breeding, shown diagrammatically in figure 5, was installed and carried out experimentally in nine privately owned trichomonad - infected herds. During periods of observation varying from two to five years, in only one of these herds has trichomoniasis recurred, and the strongest circumstantial evidence exists that this infection was reintroduced from a neighboring herd. The hygienic breeding program has been successful in ridding the other eight herds of trichomoniasis.

This program and its background are fully described elsewhere.[7] The premise on which it operates has already been described in this paper.

The Hygienic Program of Breeding.—When bovine venereal trichomoniasis is suspected as the cause of impaired reproduction, all breeding operations should be immediately discontinued pending examination for *T. foetus*. Finding *T. foetus* in the genital exudate of any individual—bull or breeding female—that has participated in the breeding operation of a herd establishes a herd diagnosis of trichomoniasis. A positive diagnosis established, the hygienic breeding program should be instituted and rigidly followed. Each of the following steps must be methodically carried out:

1) *Prepare* individual cards recording all pertinent history available for each female involved.

2) *Examine* the internal genitalia of each female *per rectum* and record the findings. Females found with conditions not related to trichomoniasis should be appropriately handled.

3) *Study* the completed record cards and *allocate* each female into her proper group in accordance with the available facts as follows:

A) Uninfected Females

Group 1—Heifers or cows that have never had coitus with a trichomonad-infected bull.

Group 2—Pregnant cows whose pregnancies were initiated by coitus with an uninfected bull and that have not had coitus with a trichomonad-infected bull since completion of their last normal pregnancy.

Group 3—Nonpregnant cows that have not had coitus with a trichomonad-infected bull subsequent to recent completion of a normal pregnancy initiated by coitus with an uninfected bull.

B) Infected or Potentially Infected Females

Group 4—Nonpregnant heifers that have had coitus with a trichomonad-infected bull, and nonpregnant cows that have had coitus with a trichomonad-infected bull since completion of their last pregnancy.

Group 5—Pregnant heifers and cows whose pregnancies were initiated by coitus with a trichomonad-infected bull or by coitus with an uninfected bull subsequent to recent coitus with a trichomonad-infected bull.

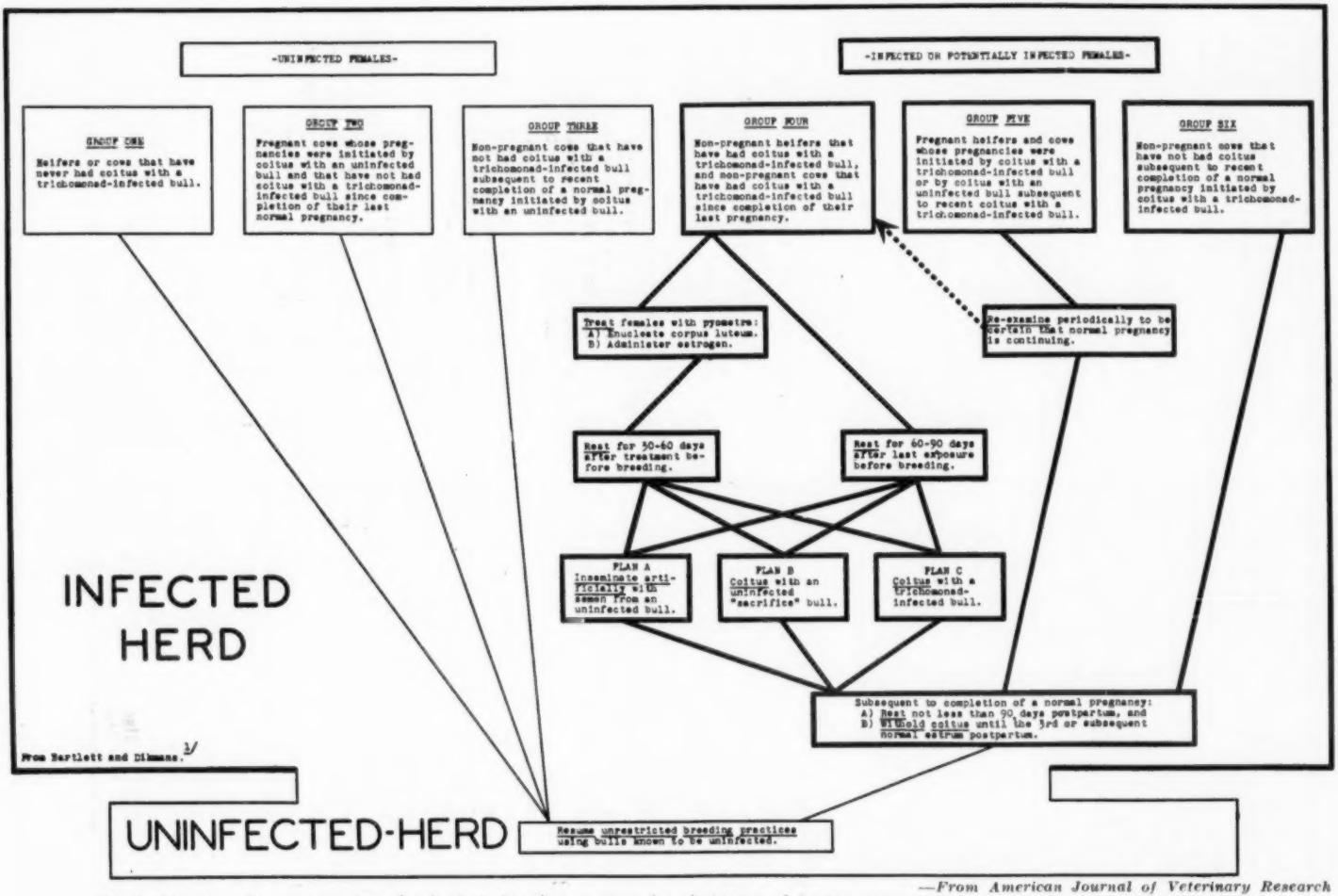
Group 6—Nonpregnant cows that have not had coitus subsequent to recent completion of a normal pregnancy initiated by coitus with a trichomonad-infected bull.

The groups properly established, members are similarly, but individually, handled at such time as action is appropriate.

4) *Eliminate when indicated* such unprofitable animals that obviously cannot again become profitable.

5) *Resume ordinary breeding practices of group 1, group 2, and group 3 females*, permitting coitus with uninfected bulls or inseminating artificially with semen from known uninfected bulls.

6) *Treat group 4 females* found to have


-UNINFECTED FEMALES-
-INFECTED OR POTENTIALLY INFECTED FEMALES-
GROUP ONE
Heifers or cows that have never had coitus with a trichomoned-infected bull.
GROUP TWO
Pregnant cows whose pregnancies were initiated by coitus with an uninfected bull and that have not had coitus with a trichomonad-infected bull since completion of their last normal pregnancy.
GROUP THREE
Non-pregnant cows that have not had coitus with a trichomonad-infected bull subsequent to recent completion of a normal pregnancy initiated by coitus with an uninfected bull.
GROUP FOUR
Non-pregnant heifers that have had coitus with a trichomonad-infected bull, and non-pregnant cows that have had coitus with a trichomonad-infected bull since completion of their last pregnancy.
GROUP FIVE
Pregnant heifers and cows whose pregnancies were initiated by coitus with a trichomonad-infected bull or by coitus with an uninfected bull subsequent to recent coitus with a trichomonad-infected bull.
GROUP SIX
Non-pregnant cows that have not had coitus subsequent to recent completion of a normal pregnancy initiated by coitus with a trichomonad-infected bull.
Treat females with pyometra:
A) Enucleate corpus luteum.
B) Administer estrogen.
Re-examine periodically to be certain that normal pregnancy is continuing.
Rest for 30-60 days after treatment before breeding.
Rest for 60-90 days after last exposure before breeding.
PLAN A
Inseminate artificially with semen from an uninfected bull.
PLAN B
Coitus with an uninfected "sacrifice" bull.
PLAN C
Coitus with a trichomoned-infected bull.
Subsequent to completion of a normal pregnancy:
A) Rest not less than 90 days postpartum, and
B) Withhold coitus until the 3rd or subsequent normal estrum postpartum.
INFECTED HERD
From Bartlett and Dimmock.[3]
UNINFECTED-HERD
Resume unrestricted breeding practices using bulls known to be uninfected.

—*From American Journal of Veterinary Research*

Fig. 5—Diagrammatic representation of a hygienic breeding program for elimination of bovine venereal trichomoniasis from an infected herd.

pyometra: Enucleate the corpus luteum, if possible, and administer an estrogen, thus encouraging evacuation and involution of the uterus and resumption of the estrous cycle. *Rest*, post treatment, thirty to sixty days. *Rest* other nonpregnant group 4 females at least sixty to ninety days subsequent to their latest exposure. *Breed group 4 females* in accordance with the plan best suited to circumstances peculiar to the infected herd concerned:

Plan A—Inseminate artificially with semen from an uninfected bull. This is the procedure of choice whenever feasible because the possibility of further venereal transmission of infection is immediately stopped.

Plan B—Coitus with an uninfected "sacrifice bull." Circumstances in some herds may make artificial insemination impractical. Particularly, if the calves are considered of little importance or are to be vealed, use of an uninfected, grade, beef-type bull of little value may be advantageous as a "cow settler." This sacrifice bull is sent to slaughter as soon as all group 4 females are known to be pregnant. When this plan is followed, postexposure rest should be maximum. There is an element of gamble in this plan as the sacrifice bull may become infected; however, if the females are given a maximum amount of rest, the opportunity for infecting the bull is held to a minimum. Should infection of the bull occur and be undetected, the consequences would be no more serious than if plan C is followed. If infection should be recognized, prompt slaughter and subsequent replacement of the bull are indicated.

Plan C—Coitus with a trichomonad-infected bull. This plan is not recommended. In exceptional conditions, however, when an infected bull of extraordinary value is concerned and a few additional calves are desired at any cost, this plan may be followed. A dangerous reservoir of infection is maintained, and additional females will probably become infected; other uninfected females may be accidentally infected.

7) *Re-examine group 5 females* frequently during their gestations to be certain that development of the conceptus proceeds normally, and that if pyometra develops or abortion occurs, these untoward changes will be quickly recognized. Should the pregnancy be interrupted, the female must be transferred to, and treated as, a group 4 female.

8) Rest, postpartum, each group 4, 5, and 6 female not less than ninety days and allow two estrous periods to pass before permitting coitus with an uninfected bull at the third or subsequent estrum.

WHERE DO WE GO FROM HERE?

Looking toward the future, certain needs imperative to more effective combating of bovine venereal trichomoniasis are seen:

1) Greater interest in bovine venereal trichomoniasis on the part of state livestock sanitary officials.

2) Greater utilization of what is already known concerning bovine venereal trichomoniasis. Herds with histories suspicious of trichomoniasis should be searched for *T. foetus* and herds infected with *T. foetus* should be appropriately handled.

3) Improved methods of diagnosis. Lack of a "one sample" method of determining the status of individual animals, particularly bulls, is the outstanding deterrent to more effective interherd control of trichomoniasis. The present equipment for collecting samples should be improved, without sacrifice of efficiency, so that it better suits the requirements of country veterinary practice.

4) More research in treating bulls is necessary. Not until a larger series of trichomonad-infected bulls has been treated by several investigators can the present experimental methods be critically evaluated.

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Dystocia in the Sow

FRANK B. YOUNG, D.V.M.

Waukee, Iowa

DYSTOCIA in the sow is again becoming a problem in the Cornbelt. Thirty years ago, this condition was common; most farm journals carried advertisements for various kinds of forceps and snares which were recommended for the delivery of pigs. It was not uncommon to see crude forceps, homemade snares and hooks hanging among the cobwebs in the large, old-style hog house.

This was the picture in Iowa when I started to practice there in 1919. It was not uncommon for a veterinarian to have 50 or more swine obstetric cases during the late winter and early spring. In 1923, I performed 26 cesarean operations on sows.

In the late 1920's and early 1930's, foreign and domestic fats came into direct competition with our lard. This depressed the lard price and created a market for a type of hog that could be cut up on the block into saleable parts with a minimum of trim. The desirable weights dropped from 350-400 lb. to 200-225 lb. The short, sleek, stuffy type of lard hogs disappeared from the Iowa feedlots. In their place came the rough, highback Duroc-Jersey, Hampshire, Tamworth, and a large type of spotted Poland-China. Diseases and parasites made the old hoglot and its large central hog house a liability, so the clean-ground method of raising hogs, with the small individual hog houses, was used. On account of the weather, the sows were bred for later farrowing; they had more exercise, and we learned to balance the corn ration with protein supplements and minerals.

With these changes, dystocia in swine all but disappeared. From 1930 until 1943, I did not average five calls per year for this condition, and many of these were for sows having 1 or 2 pigs and the owner insisting they should have more. The low price of hogs during the depression and pre-war years had some influence on the number of calls for this condition, but an increase from five calls per year to 50 or more definitely means more dystocias.

During the war, the corn-hog ratio was favorable for the feeding of hogs. The demand for fats was up, and there was a general lack of interest in the quality type of swine. The demand was for more hogs, so we bred more sows to any type of boar that was available. The Hereford and Berkshire were crossed into our herds and recrossed. This was a mistake, for indiscriminate crossing of breeding stock causes trouble. Until such time as hogs are graded at the market for quality, we shall have this type of breeding, and hog raisers will have to put up with the losses incurred by dystocia and poor conformation.

To get the reaction of other Iowa veterinarians, 25 questionnaires were sent to practitioners who had practiced in large swine-raising areas more than twenty years. Twenty-four of the questionnaires were returned. It was the overwhelming opinion of these men that conformation and the ration were the main causes of dystocia in sows.

The immediate causes of dystocia in sows, in order of their frequency, are large-shouldered fetuses, uterine inertia, mal presentation (breech and poll most common), torsion, dead fetuses, fractured pelvis, monsters, etc.

Swine obstetrics is not a desirable type of practice; too much time is required for each case and many of the calls are at night or run into the night. The quarters where the sows are kept are small, with low ceilings, and the animals are hard to restrain and usually insist on lying with their hind parts close to the walls. If restraint is necessary, there is hardly room for the restraint man, the sow, and the veterinarian. The sow squeals and that stirs up other sows in the same building or close by and may cause them to injure or kill their pigs. When approaching this type of case, one must be quiet. The animal is usually lying down and does not resent cleansing of the external genitals with warm water and mild disinfectant solution. Liquid soap is used as a lubricant. The first two fingers are inserted into the vagina and spread; this usually causes the sow to labor. If the fetus is well engaged in the birth canal it can be felt and a method of delivery can be determined.

The art of delivering pigs cannot be taught, but must be learned by the individual. The size of the birth canal, size of operator's hand and length of fingers will

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determine the kind of instruments to use. On account of a large hand and short fingers, I depend upon forceps altogether and have become quite efficient in their use. There are probably a few individuals who have hands with long narrow fingers, and they may find some sow on which they can work quite easily. I used to know a veterinarian who took his wife along to do the porcine obstetrics. Sometimes a boy in the neighborhood can become quite adept, if he has small hands. In my experience, it doesn't make much difference whether you use snares of various kinds or whether you use forceps. The important thing is to develop a technique. Practice and patience are necessary to become efficient in this operation. Nowhere in the practice of veterinary obstetrics is patience of more value. If you have none, or it becomes short under the adverse conditions encountered in this operation, I would advise you to depend on cesarian section.

If the sow has labored for some time, the natural lubricants that are present in normal birth are absent, and some form of lubrication is necessary to aid in bringing the pig through the canal which is often inflamed and almost dry. Mineral oil is poor for this purpose. I like commercial lubricants that have a mild disinfectant in them and come in collapsible tubes. The plunger of a well-working dose syringe can be removed and the lubricant squeezed into the barrel; then use it like a grease gun. A pipe with a ball on the end, like that used for dosing sheep, works very nicely.

If the pig can be delivered without lacerating the sow, 2 cc. of lentin is injected into the ham. After fifteen minutes, the sow is examined again. If the next pig is well engaged, it is helped out with the careful use of forceps. Usually, a small flow from the vagina, as the sow labors, indicates another pig is coming. Sometimes a part of the placenta will come away with each pig but this does not mean the sow is through. I know of no sure way of telling when a sow has had her last pig. Many times, we instruct the stockman how to examine the sow and then call us if more pigs are presented and not delivered in a reasonable length of time. Since changing from posterior pituitary extract, we have not had as many return calls. In the questionnaire sent out to 25 veterinarians, we asked which ecobolic was their choice in swine obstetrics, and, much to my surprise, 80 per cent still chose posterior pituitary extract. Lentin makes about 1 sow in 3 sick and they vomit, but we tell the owner what to expect so that he is not so worried about it. Most sows defecate and urinate rather promptly after this drug is injected. Many times a full bladder blocks the birth canal. At least you can see action from this drug, which is more than you can say about most injections of posterior pituitary extracts.

Small, short-bodied sows, presenting large fetuses, should be operated on at once if surroundings are suitable for clean operating; otherwise they should be butchered. In my opinion, the meat is wholesome and the salvage obtained by butchering the sow is worthwhile. If slaughterhouses are close, it offers the owner a way to save part of his investment. If your cesarian operations are to be successful, refuse all cases that are badly lacerated, where fetuses are gas-infected, or where sows are showing shock or extreme exhaustion.

The general causes of dystocia can be eliminated by careful selection of breeding stock, mating sows to boars of the same type, and general, good swine husbandry.

DISCUSSION

CHAIRMAN JOHNSON: The paper is open for discussion.

DR. BROWN (CALIF.): How do you handle a prolapsed uterus in a sow?

DR. YOUNG: We see few prolapsed uteri. They can sometimes be returned rather easily and a purse string suture around the vulva will hold them in place. If the vagina is prolapsed and has been out very long, scraping the membrane and removing most of the mucosa aids in replacement. This may cause a considerable amount of bleeding, but the organ will shrink and usually is not difficult to put back.

However, if you have one that is out and badly lacerated, or if you have a sow that is having difficulty in having pigs, and that hasn't been in labor too long, and you think it looks hopeless, send it to the butcher. In my opinion, this meat is palatable and wholesome. I don't mean a sow that is bloated with a dead fetus in it. If the animal can go to market, a great many of them will pass inspection, even though they are carrying pigs.

DR. BROWN: Do you have any special technique for putting the uterus back in? That is what I want to know.

DR. YOUNG: Well, no special technique. We have a small instrument that has the end of a broom handle fixed on a little metal rod. Sometimes we can work the uterus back in with that. Some are practically impossible to replace. Lots of times, however, they are just vaginal prolapses, and if you scrape them, like your wife scrapes a carrot, removing the outside membrane, you will find they will shrink up. My experience has been that a purse string suture around the vulva will keep it in.

DR. GRAFTON: Does the subcutaneous fat interfere with the action of the posterior injection?

DR. YOUNG: I prefer to inject from inside or behind it, into the ham. Fat has very little circulation, and if you inject in an area of fat, I don't believe you get much results.

DR. BOYD: I would like to say something about brucellosis, due to the fact that porcine brucellosis is on the increase and because of the susceptibility of man to the bacilli. The practitioner should at all times take every precaution against unduly exposing himself. The infection in man is very severe.

DR. STEINHAUER (S. Dak.): I would like to ask which is the best method.

DR. BOYD: I believe that using the rubber glove with the sleeve is the only absolutely safe method. There is no question but that the bacilli gain access to the human being through the skin, and there is some reason to believe that it may gain access to man through the nasal mucus, in case the pens are dusty.

CHAIRMAN JOHNSON: I want to thank Dr. Young for his presentation and Dr. Boyd for his warning.

Infertility in Stallions

Extended breeding tests have proved that hormone and vitamin therapy is valueless except where the sterility actually is caused by a lack of these substances (B. F. Trum, *The Blood-Horse*, Feb. 26, 1949). It also is futile to attempt to treat sterility caused by faulty germ-plasm, *i.e.*, stallions which produce no sperm, dead sperm, or sperm having lethal characteristics.

Long trips, changes in climate and altitude may result in a "complete blank" until the stallion is acclimated. However, if due lapse of time and adequate tests show that the stallion is unable to produce viable spermatozoa, he should be retired or destroyed. Several tests may be necessary, since permanent sterility cannot be diagnosed on the basis of the first test, nor even the second. Cases are on record where horses did not have a single spermatozoon for days, then suddenly they tested perfectly.

When stallions of apparent anatomic soundness and in good physical condition fail to cover the mare, the trouble may be a conditioned reflex built up by continued discipline while in training. With patient handling, such a horse will become a breeder, although it is likely he will be slow. Male hormones, particularly testosterone, are said to have a good effect on slow breeders, but frequent use is known to decrease the number of spermatozoa. In view of this, the psychology approach is preferred. For example, act as if you were going to let the tease horse cover the mare (competition motive) or bring the horse into the shed and, unless he mounts promptly, return him to his stall (reward motive).

It is useless to add anything to the feed, except nutritional factors for improving general condition. Use of Spanish flies is barbaric, and drugs such as damiana and yohimbine cannot be used many times without detrimental effect.

Occurrence of bacteria or pus cells in the semen following a direct cover usually can be traced to the mare. If, however, the infection is definitely traced to the stallion, penicillin and sulfonamide treatment will be necessary.

Borderline cases, which have few live sperm and can be either fertile or sterile, present the biggest problem. Hormone and vitamin treatment, determined by laboratory analysis, is one alternative, but the preferred method is to get the horse in the best possible breeding health and then make maximum use of whatever reproductive capacity he has through adherence to a well-planned breeding program based on his idiosyncrasies and responses to environmental factors.

One of the best ways to determine a questionable stallion's ability is to turn him out daily with a band of about 10 inexpensive mares for not less than three months. Whether he should be saved for better mares can be determined by his performance during this period.

For blood transfusion use a 1-gal. jug; place in it 1 oz. of sodium citrate or 1 pt. of sodium citrate solution. Insert a double stem stopper with a milk-fever bulb and valves for vacuum attached to one stem. Transfuse a full gallon for "red water disease" or postparturient hemoglobinuria, sweet clover disease, "downer" cows, uremia. Along with this intravenous injection, feed bone meal, cobalt, and other stimulants. During the winter, a heavier injection is necessary than during the summer.—*K. K. Shott, D.V.M., Idaho.*

To maintain and improve blood lines, American livestock farmers imported 42,000 head of purebred animals in 1948, according to the Production and Marketing Administration of the USDA.

Pethidine hydrochloride intravenously is a good substitute for chloral hydrate *per os* to quiet intractable horses for shoeing or other handling. MacAllister (*Vet. Rec.*, Jan. 1, 1949) reported that 600 mg. accomplished the purpose in five minutes in a horse but that thrice that amount, intramuscularly, was ineffective in a bull.

A significantly greater percentage of infertile strongyle eggs was passed by horses receiving phenothiazine on a periodic, low-level basis. Each received 2 Gm. of phenothiazine powder in the feed daily for two weeks, followed by a week of drug rest. From 50 to over 75 per cent of the eggs were infertile from treated horses, as compared with 2 to about 6 per cent from untreated horses, not to mention, also, that the treated horses passed fewer eggs.—*Todd and Hansen, Kentucky Agric. Exper. Sta.*

CLINICAL DATA

Clinical Notes

Sodium morrhuate (3 to 4 cc.) may be injected into a ranula to destroy the secreting cells—*B. F. Hoerlein, D.V.M., Alabama.*

The sloughing which follows deposit of chloral hydrate solution in the tissues outside the jugular vein may be avoided by infiltrating the area with 250 cc. of physiological saline solution.—*W. E. Coffee, D.V.M., Kentucky.*

For teat injuries and strictures, silver nitrate applicators may supplant the teat slitter. Burn away the excess tissue in the streak canal. Milk may spray from the teat for a week during which recovery is complete. The teat is never sore.—*J. F. Knappenberger, D.V.M., Missouri.*

Three simple steps will help greatly in controlling mastitis: (1) Keep the heifers and clean cows at the head of the milking line; (2) milk badly infected cows by hand; and (3) dip all teats in a chlorine solution when stripped dry.—*O. W. Schalm, California.*

We have yet to see failure of brucellosis vaccination that was not due to (1) defective vaccine, (2) careless handling of good vaccine, or (3) poor herd management after vaccination. The greatest danger from the first two causes appears when the owner does his own vaccinating.—*J. W. Bailey, D.V.M., Guernsey Breeders' J., Jan. 1, 1949.*

Dicumarol.—The terrors of the hemorrhagic disease of farm animals caused by eating spoiled sweet clover hay are being dramatized in human patients treated with dicumarol, the active agent of the spoilage. The statement that "The drug should be used cautiously, if at all" (*J.Am.M.A.*, March 19, 1949) signalizes the danger attached to dicumarol in human medicine.

Antibiotic Agents (Corrigendum)

In the tabulation of the antibiotic agents (JOURNAL, April, 1949: 195), each instance where the word "Streptococcus" appears, it should read "Streptomyces."

In Illinois, X disease, characterized by a thickening of the keratin layers of the skin, was not associated with malnutrition or undernutrition.—*C. C. Morrill, Illinois.*

Eosinophilia from Crystalline Penicillin.—Continuous administration of crystalline sodium penicillin for eight weeks produced an asymptomatic eosinophilia which disappeared after treatment was stopped, but which recurred following short course treatments with this drug. Boston physicians reported (*Ann. Allergy*, Nov.-Dec., 1948) that allergy to the drug was the probable cause.

Anaphylactic Death from Penicillin.—In the face of extensive use of penicillin in animals, the sudden death of a woman, 39, suffering from asthma, following a 50,000-unit dose is worth reporting. The woman was given penicillin treatments in April 1947, May 1948, June 1948, and April 1949. A violent reaction and death occurred within a few minutes after receiving the last dose. Extreme cyanosis, generalized pruritus, edema of the nose and throat, and sudden death was the clinical tableau described.—*From Clinical Notes, J.Am.M.A., Feb. 19, 1949*

Equine Tuberculosis

Tuberculosis in solipeds is rare. In France, out of 415,361 horses slaughtered under inspection from 1936 to 1947, there were but 49 cases (0.0118%). In more than forty years of practice in Chicago, Merillat saw but 2 clinically tuberculous horses. One was a cart horse that seemed to have contracted the infection by habitually licking blood from the floor of the cart ahead, perhaps for a number of years, and the other was an orphan farm colt raised on cows' milk. Illartein, Satrat, and Verge (*Rec. Méd. Vét.*, Jan., 1949) report comparable percentages in Denmark, Sweden, and Germany. These authors, however, conclude from reviews of the literature and personal observations that the tuberculin test reveals a higher incidence of nonclinical cases, some of which may be due to avian infection or to the nonspecific allergy horses are believed to possess.

The Public Health Significance of Bovine Udder Infections

I. A. MERCHANT, D.V.M., Ph.D., C.P.H.

Ames, Iowa

ON A WALL long buried in Babylon and recently excavated, there is a frieze of cows with their calves, and men in the process of milking. This frieze was made approximately 5,000 years ago. On a side of a cave in the Pyrenees, there is a crude drawing of a cow. Archeologists estimate that it is 20,000 years old. Among the stories of Hindu folklore, written 5,000 years ago, the cow is praised as the benefactor of the human race. Whenever the curtain is drawn from the long buried past, evidence is found that the cow was used as a source of food. Whenever civilization moved into new countries, the cow went along and became an important part of it. In view of these facts, it is readily understood why the cow is known as the foster-mother of the human race.

In the present mechanized world, the intimate relationship of the cow and man is frequently forgotten. Milk is considered as a white fluid, processed and piped hither and yon, ultimately coming to the American family in an attractive paper carton. It frequently is thought of as a beverage —not a food, its health-giving qualities not recognized.

BOVINE INFECTIONS TRANSMISSIBLE TO MAN

There is little doubt, in view of our present knowledge of milk, that human populations, existing since the cow was domesticated, have been afflicted by numerous diseases which had their origin in the cow or were spread by the milk after contamination. There is, likewise, little doubt that human populations have become resistant to numerous diseases which have been common to the cow and man. One, familiar to all of us because of its development during this period of history, is cowpox.

In spite of this long association, there still are a number of infections which are primary in the cow, transmissible to man, and therefore of considerable public health significance. Hull gives a formidable list of diseases which may be transmitted from cow to man. It is of interest to note, upon examining this list, that there are so few of the conditions transmitted by milk or due to contact with the udder.

In recent years, bovine tuberculosis has ceased to be a significant human health problem. To fully realize this, one only needs to examine the progress made in bovine tuberculosis eradication since 1917. The peak in the per cent of tuberculin reactors was 4.9 in 1918. Since then, the percentages have gradually decreased to 0.2 in 1947. Attention has been called to the decreasing number of cattle tested for tuberculosis, and a natural inquiry would be if such a factor would tend to increase the number of tuberculous cattle. While such has been the case in isolated herds and communities, it apparently is not true nationally. Records of the Federal Meat Inspection Division reveal that the ratio of slaughtered reactors to condemnations has been steadily decreasing, showing that there is a gradual diminution in the severity of the disease. Likewise, the ratio of slaughtered reactors to sterilized carcasses has decreased. The records, showing the extent of tuberculosis in the nontested cattle slaughtered in federal establishments, reveal that the percentage of condemned and sterilized carcasses likewise has steadily decreased—from 0.42 in 1918 to 0.007 in 1947. Consequently, on the basis of these data, it is obvious that bovine tuberculosis has not increased nationally during the war years, and any set-back is probably local. Nevertheless, we all must agree that this most significant contribution to human health must be made a more outstanding accomplishment and actively pursued to complete eradication.

In the Middle West, we think of brucellosis in man in terms of contact with infected cows and swine, but approximately 40 per cent of the cases are due to *Brucella suis*. This leaves the remainder of the cases due to the bovine type of the organism, only a part of which can be traced to an infected mammary gland. Numerous isolated cases of this disease occur in rural communities and in small urban places where the milk supply is not adequately protected. During the past year, an outbreak of the disease in the eastern part of the United States was described by Steele and Hastings. Time and space prohibit a full discussion of the relationship of bovine brucellosis to human health. It remains

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one of the most important problems of veterinary public health. We must accept it as our problem and do everything in our power to decrease the number of infected cattle in the United States.

BOVINE UDDER INFECTIONS

When the subject of bovine udder infection is mentioned, one immediately thinks of those causal agents, streptococci and staphylococci, which are found most frequently in chronic bovine mastitis. No evidence has been presented to show that *Streptococcus agalactiae*, *Streptococcus uberis*, and *Streptococcus dysgalactiae* are pathogenic to man. Certainly, any serious infection which they may produce would have been detected long ago, because there is ample opportunity for people of all ages to have contact with these organisms by consuming milk. There is a species of Streptococcus, *Streptococcus pyogenes*, which has a great deal of significance to human health and which may originate from the bovine udder. This Streptococcus is recognized as one of the microörganisms responsible for many different types of infections in human beings, chief among which are septic sore throat and scarlet fever. Numerous milk-borne epidemics of both of these diseases are detected annually and, in most instances, the cow is involved. This Streptococcus is not a primary invader in the cow. Infection results only upon contamination of the teats by the milker, who either is a carrier of the organism or has an active infection. It is not inferred that all milk-borne epidemics of septic sore throat and scarlet fever originate in the bovine udder. Numerous outbreaks of these diseases are due to the contamination of milk after it leaves the udder and reaches the consumer in the bottle. But a number of severe and extensive epidemics have been traced to the mammary gland; consequently, the cow must be suspected in each instance.

It is generally assumed that the pneumococci do not produce infection in animals. However, attention is called to a report by Schofield and Swan in which a type III Pneumococcus was isolated from 7 cows. All of these animals were definitely infected and, in some cases, all four quarters were involved. The quarters were swollen and the milk was "slimy" in consistency. Temperatures were 104 to 105 F. and anorexia was present in most cases. Although no evidence was obtained to show that this organism was transmitted from these cows to human beings, such transmission is possible.

During recent years, it has become evident that staphylococci play an important rôle in bovine mastitis. The percentage of the cases in which these microörganisms are the primary etiologic agents is high. Packer, in our laboratory, has found that 76 per cent of the milk samples submitted by veterinarians, to be examined for the mastitis organisms, yielded *Staphylococcus aureus*. This makes it apparent that milk serves as a prolific source of this organism for the human family. The rôle of this coccus in the different infections of man is well known. It is generally associated with suppurative lesions of the skin and the throat region. Probably of greater significance, from the milk-borne disease viewpoint, are the acute symptoms of food poisoning which are caused by the specific enterotoxin produced by some strains of the organism. Numerous epidemics of staphylococcic food poisoning have been traced to foods in which mastitis milk has been incorporated. The following is a typical example.

On Sept. 26, 1946, an outbreak of gastrointestinal upsets occurred in 30 men, mostly football players. The symptoms were mainly diarrhea with some vomiting, followed by a fever lasting from twenty-four to forty-eight hours. A second outbreak confined to football players eating a special diet occurred Oct. 6, 1946, with similar, but milder, symptoms and no fever. In the second outbreak, the onset of the first case was at about 12:30 a.m. and the last between 10:30 and 11:00 a.m. on October 6. All the patients recovered in about twenty-four hours.

The meals eaten by patients prior to each outbreak contained a variety of foods, including milk. All the foods, with the exception of the milk, were believed to be safe for human consumption upon receipt and were prepared and stored in a sanitary manner. Stool and urine cultures of 7 food handlers were positive for *Bacillus proteus*, 1 for *Bacillus morgani*, and 6 were negative. Histories of recent illness on the part of these employees were negative and none had sores on their hands. Examination of feces collected from some of the football players on October 7 revealed *B. proteus* in 4; 7 were negative. Further epidemiologic study appeared to rule out foods other than milk as the vector.

Milk for the college was obtained from three sources. An ungraded, poorly produced and handled raw supply was provided by the college herd and a local farmer, and some milk labeled "grade A pasteurized" supplemented this supply. The raw milk was found to have excessive bacteria counts, *Staph. aureus* was isolated from 7 samples but no other pathogens were found. In view of the bacteriologic findings on this milk supply, the methods of handling and storing milk, and the history and nature of the outbreaks, it appears that the outbreaks resulted from milk-borne Staphylococcus enterotoxin.

The detection of the source of the bacteria which cause food poisoning is not always a simple matter. Frequently, these organisms contaminate food during its processing. This is true particularly of staphylococcic food poisoning. But the presence of the organism in the udders of bovine animals is sufficient evidence that this may be an abundant source of infection.

Other bacterial agents have been incriminated in food poisoning in addition to *Staph. aureus*. Whether udder infection can be blamed for these infections is a matter of doubt. An outbreak of gastroenteritis which was caused by *Pseudomonas aeruginosa*, producing 464 cases, occurred in Kansas in 1945. This organism has been isolated frequently from active cases of mastitis, but whether this outbreak originated from infected udders was not confirmed. However, the fact that the organism does produce food poisoning and does cause bovine mastitis is enough to incriminate it as one of the hazards to human health.

Mention must be made, also, of another microörganism which has been shown to produce food poisoning. During the past year, Buchbinder and coworkers have demonstrated that *Streptococcus faecalis* produces gastroenteritis in man. This organism has been isolated from milk on numerous occasions but has never been known to produce mastitis. Belonging, as it does, to the general flora called enterococci, it is quite probable that the milk becomes contaminated with fecal material from cattle and human beings.

Escherichia coli causes bovine mastitis. The relationship of this organism to human infection is undisputed and the prevalence of cholera infantum, in the days when raw cow's milk was fed to babies, is understandable. There is little doubt that much of the transient diarrhea still occurring in human populations can be traced to milk contaminated with this organism. It is obvious, however, that this organism, likewise, is present in milk as a result of fecal contamination.

Milk-borne epidemics of diphtheria are recorded now and then. In most instances, a diphtheria carrier is responsible for contaminating milk during its processing. There have been cases proved, however, where the bovine mammary gland has been infected, by a carrier, with the diphtheria bacillus.

Other organisms such as *Pasteurella multocida* and *Proteus ammoniae* are found in bovine mastitis and in human infections, so there is a possibility that milk may be one of the vehicles by which they are spread.

Cowpox is one of the oldest diseases known to be transmitted from the cow's udder to man. Cases of "milkers nodule," produced by the virus of this disease, are rare but are reported occasionally. One of the most recent diseases, about which little is known but which has tremendous importance, is Q fever. *Coxiella burneti*, the cause of Q fever, grows in the mammary gland producing clinically recognizable symptoms, so the importance of milk in epidemics of Q fever in human populations is great.

Lastly, there is an effect of mastitis milk alone upon the well-being of man. Such milk is of poor flavor and keeping quality, and its prevalence in most areas is a definite deterring factor in milk consumption. Any diet devoid of milk is detrimental to health, particularly in children.

Coccidiosis in cows often responds to daily administration of 4 Gm. of $CuSO_4$, 12 Gm. of $FeSO_4$, aqua *q.s.* to make 1 quart. —*J. F. Knappenberger, D.V.M., Missouri.*

Night-Feeding for Hogs.—Hogs fed at night during the summer months ate more and reached market weight faster in a practical experiment on an Illinois farm (*Agric. Leaders' Dig.*, Nov., 1948). Hogs which were reluctant to eat during the heat of the day freely patronized illuminated self-feeders at night.

LIVESTOCK HEALTH ODDITIES
SWINE FED FOR SHORT PERIODS AT NIGHT UNDER ARTIFICIAL LIGHTS, ARE SAID TO MAKE BETTER GAINS.
SPINAL ANESTHESIA NOW USED IN CHILDBIRTH WAS ORIGINALLY DEVELOPED BY VETERINARIANS FOR USE WITH ANIMALS.
OX WARBLES, THE 100 MILLION DOLLAR PEST OF CATTLE, CAN INFECT AND CAUSE SEVERE SICKNESS IN CHILDREN.
American Foundation for Animal Health

A New Approach to the Treatment of Bloat in Ruminants

A. H. QUIN, D.V.M., JAMES A. AUSTIN, B.A., M.Sc., and KARL RATCLIFF, B.S.

Kansas City, Missouri

PRIMARY or secondary bloating of ruminants is an economic problem of major importance in all countries.

During the past quarter of a century, some very fine research reports have appeared in the literature of animal husbandry and veterinary science. Among these should be mentioned the reports of Cole *et al.*[1] in America, Clark and Quin[2] in South Africa, and Evans and Evans[3] of Britain.

Hand in hand with observations on pathologic states of the forestomachs, we also have had noteworthy contributions on the physiology of ruminant digestion by Dukes of the New York State Veterinary College, Schalk of Ohio State University, Hewitt and Bergman of Iowa State College, and many others.

We must not overlook the scientific contributions of the bacteriologists. Thus, Hastings[4] in a brilliant review has pointed out that the rumen, far from being simply a storage vault, is a virtual metabolic beehive of essential activity. Within the ruminal vault countless species of bacteria and Protozoa enter into the splitting of cellulose, the defractionation of proteins, and the synthesis of vitamins.

The Treatment of Bloat.—Treatment procedure for bloat on a symptomatic basis may be classed as (1) palliative and (2) emergency. Palliatives include the age-old gag in the mouth, cold water on the flanks, and peroral administration of antiferments. Emergency treatments include all of the foregoing palliative measures plus tapping, evacuation of the rumen by the Kingman tube, and rumenotomy. All of these corrective treatments possess limitations too well known by all veterinarians to merit more than passing mention. For example, Clark[5] in a recent report warned against the danger of ruining the essential bacterial flora by administration of "disinfectant-type" antiferments such as formalin, copper sulfate, turpentine, and cresylic acid compounds. Passage of the oversize Kingman tube is an acrobatic accomplishment for all but the most skilled operators, and the prognosis of emergency rumenotomy is always guarded.

The Causation of Bloat.—Research has still failed to clarify all the answers to the problem of why some animals bloat and some do not. Clark and Quin[2] and, more recently, Evans and Evans[3] have cited the relation of contained hydrocyanic acid in legumes as a causative factor in ruminant meteorism. Others have cited that the saponin content of legumes and grasses is of etiologic significance. But, whatever the true cause, the bloated animal is incapable of normal belching and regurgitation.

Autopsies and rumenotomies on cattle suffering from that type of tympanitis commonly known as "frothy bloat" have invariably shown that a froth composed of bubbles is homogeneously mixed throughout the ruminal and reticular food mass. Within the bubbles are such toxic gases as methane, hydrogen sulfide, nitrogen, and carbon dioxide. We postulate that bloating is primarily due to gas entrapment within the froth bubbles because of decreased surface tension. Clark[5] has recently shown by *in vitro* tests that turpentine—probably the best of drugs used in bloat—exerts action by *increasing* surface tension. This same type of action is typical of kerosene and mineral oil.

To those unacquainted with the physics of surface tensions, a simple example will clarify understanding: Add one of the radio-publicized washing compounds to water and a "mountain" of froth or suds occurs because surface tension has been decreased to the point where particles of air are trapped in a film of detergent. This same phenomenon occurs within the paunch of a bloated ruminant.

A New Approach to Treatment.—Samples of a surface tension-increasing agent—a preparation containing a highly polymerized methyl silicone—were submitted to 34 representative veterinarians in different parts of the country for field trial on actual cases of bovine bloating. The product was either injected directly into the dorsal vault of the rumen through a 14-gauge, or larger, hypodermic needle, or diluted with water and given perorally as a drench or by stomach tube.

Of the 155 cases of bovine bloat treated in this manner, 115 made perfect recoveries, many of them in a phenomenally short time. Most of the cases recovered after a single treatment. Some were given

Field reports cited in this article were based on the use of a preparation trademarked "tympanol," developed by the Jensen-Salsbery Laboratories, Inc.

collateral medication (purges, stimulants, etc.), or were tapped prior to treatment. The recovery rate was approximately 80 per cent when the agent was used in tablet form, crushed and diluted with water, and 95 per cent when an injectable, ready-to-use suspension was employed. Data indicate that the treatment is most effective by intraruminal injection.

The dose of the surface tension-increasing suspension is 100 cc. for adult cattle: 25 cc. for sheep and goats.

While only one actual case report is available, it appears that this method of treatment is equally applicable to cecal tympany of horses and mules.

SUMMARY

Primary bloating of ruminants is related to entrapment of gas bubbles within the food mass of the rumen and reticulum because of decreased surface tension. A total of 155 cases of bloat in cattle were treated with a highly polymerized methyl silicone to increase surface tension of the ruminal food mass. This medication was given by intraruminal injection, by drench or by stomach tube. Of the 155 treated cases, 115 made perfect recoveries. Data indicate that the treatment is most effective by intraruminal injection.

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Aureomycin in Leptospirosis

Experiments with laboratory animals at the Mayo Clinic demonstrated that treatment with aureomycin was effective in shortening the febrile course of, and preventing death from, *Leptospira icterohemorrhagiae* infection. The investigators recommended a dosage level of 1.4 mg./kg. daily. In comparative tests, this antibiotic agent proved to be about twice as effective as penicillin, on a weight for weight basis of the crystalline compounds, in protecting animals against fatal leptospirosis.—*Proc. Staff Meet., Mayo Clinic, Dec. 8, 1948.*

The Milking Room

"Milking Room" is the title of an illustrated editorial in *Successful Farming* on the milking room and pen stable of the probable dairy farm of the future. The objects of the change from the standard dairy-barn setup are (1) labor saving, (2) economic shelter, (3) clean milking practices, and (4) easy operation, to which might be added (5) more comfort than stanchion confinement affords. Specifications and related costs for sizes and arrangements corresponding to the number of cows to be accommodated are given, together with the cost of making over the original buildings.

A foregone conclusion is that the revolutionary engineering will create a new veterinary frontier—whether for better or worse remains to be seen. There are the common manger and watering trough, the bulling cow, and the hazards of herd life to be considered to balance the probable reduction of teat and udder injuries and infections. Pen stable, milking room, and milk house attached at floor level convey the general idea, but prospective builders of such an installation are admonished to assure themselves against violation of state laws, especially those pertaining to detached milk houses.

The impulse to make this change is evidently not widespread, judging from the small attention given to it in the farm papers. The fact, however, that prefabricated milking rooms are advertised shows that the issue is alive.

Grass Hormone Boosts Milk Yield

A female sex hormone found in the fresh, young grass cows eat in springtime may be responsible for the seasonal increase in milk production, according to British research (*Sci. News Letter*, Jan. 1, 1949). Hormones extracted from spring grass were just as effective as pure female sex hormones in boosting milk output, whereas extracts from year-old hay had no effect. In view of this finding, the popular view that cows produce more in the spring because they eat more may not be entirely correct.

The art of veterinary medicine has been practiced for at least four thousand years. Ancient Babylonian tablets, the Code of Hammurabi which is believed to have been formulated about 2200 B.C., make reference to the healing of man and animals, and prescribe fees and penalties which relate to both.—*W. A. Hagan, D.V.M., Ithaca, N.Y.*

Some Types of Forage Poisoning in Oregon Cattle and Sheep

J. N. SHAW, B.S., D.V.M., and O. H. MUTH, D.V.M., M.S.

Corvallis, Orgeon

FOR A great many years, farmers in the Willamette Valley have been growing seed crops. The by-product from these crops has been so-called screenings, and for forty or more years, livestock people have fed these screenings to their animals in place of grain or hay. During mild winters, the grass in the pastures remains fairly good and, if supplemented with good screenings, cattle and sheep winter fairly well. For many years, it was thought that some disorders in cattle and ewes were due to the feeding of oats and vetch screenings.

Fig. 1—Calf recently removed from English rye grass stubble.

METHODS OF INVESTIGATION

In 1939, one of the authors, in company with the local practitioner, had a chance to see animals showing peculiar symptoms. These were dairy cattle on a farm near the Oregon Agricultural Experiment Station. One animal had died, 1 had fallen in a water trough and drowned, and 5 others were showing marked symptoms. They were extremely nervous and, when a sharp noise was made, their movements were very incoördinated. A peculiar twitching of the ears was noted and when these animals were driven around in the covered shed, they stumbled and fell. All 7 of the affected animals died. When the cattle were first noticed to be sick, the owner found that they had cleaned up several hundred pounds of screenings that had been dumped in one of the pastures. It was felt that these screenings were responsible for the trouble, but efforts to find what it was about the screenings that caused the trouble failed.

In 1940, ewes showing similar symptoms were seen. These animals ate normally and appeared well until driven. They had been on a rye grass *(Lotium perenne)* stubble and when the owner wanted to move them to better feed, he found he had to haul them out with a truck. These ewes stopped showing symptoms in a few days when changed to other pastures.

In 1941, there was a report of trouble in cattle that were wintered on pea vine ensilage. When these cattle were driven to the summer range early in the spring, it was found that, if hurried, they would fall and go into convulsions. These animals showed marked incoördination and when excited showed a great trembling of the muscles throughout the body, especially those of the face. All recovered if allowed plenty of time for movement.

Efforts to find the cause of this trouble failed, but later it was found that some of the fields from which the peas were obtained

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also contained large amounts of nightshade *(Solanum nigrum)*. Some of the peas had to be condemned because the berries from this poisonous plant were found in the canned peas. It has been thought that this poisonous plant might have been responsible for the nervous manifestations

Fig. 2—Ewe on English rye grass stubble.

noted in the cattle on pea vine ensilage. In other parts of the state, such ensilage has been fed without causing any trouble.

In 1941, the trouble previously seen in ewes that were on rye pasture appeared in other sheep and in young beef calves. All were on perennial rye grass stubble and all recovered when removed from these pastures. In 2 of the calves, large doses of vitamin B_1 were used. It was thought that some beneficial effects were obtained, but treated animals recovered at about the same rate as the controls.

In 1945, losses were reported in cattle that had been fed chewing fescue *(Festuca rubra commutata)* screenings for about three months. These animals were on pasture and were given a poor quality of grass hay. Eight head of cattle died and 8 others were showing symptoms when the trouble was investigated. These animals were also showing nervous symptoms, falling, trembling of the muscles, and marked incoördination. Of the animals that were showing symptoms, 2 others died and 6 recovered. The owner reported that horses fed on this same feed were affected, but driving these animals failed to cause symptoms to develop. In another group of beef animals on a mixture of rye grass and chewing fescue, losses were severe. Affected animals showed symptoms similar to those on fescue screenings. Losses stopped when the animals were removed from these pastures.

FEEDING TRIALS

When losses were first reported in ewes near the Oregon Agricultural Experiment Station, samples of the suspected fescue screenings were obtained and fed to experimental sheep. The screenings were fed at the rate of a handful or so a day, and increased until, at the end of ten days, the sheep were getting about 1 lb. per day each. Before these animals were brought up to 1 lb. of screenings each, several were showing symptoms similar to those seen in sheep and cattle pastured on chewing fescue screenings. (One batch of these screenings used for experimental feed had apparently killed 75 ewes. Another batch, labeled as being from the same source, caused numerous abortions and many deaths in ewes about ready to lamb.) Again, these screenings caused losses in experimental sheep, symptoms appearing after experimental animals were fed for six days.

Three autopsies were made on sheep fed fescue screenings. The lesions found were mostly hemorrhages. Such hemorrhages were extensive in the large bowel and under the endocardium. In 2 cases, hemorrhages were seen in the gall bladders. When pure fescue seed, containing 98 per cent pure seed, was fed, no symptoms appeared. Six animals were fed 100 lb.; they were on pure seed, 1 lb. each, in ten days. In examining the fescue screenings that seemed to be responsible for losses, it was noted that many free-living nematodes were present. These nematodes were identified by our botanist as *Anguina agrotis*. They are microscopic in size and form galls. In some case, as high as 20 per cent of the fescue seeds in the screenings were infested with the parasite. In many cases, the entire caryopsis was destroyed and replaced by nematodes and these were commonly called "galls." Usually, when infested seeds are placed in warm water, nematodes will soon be seen free in the water.

When nematodes were ground, filtered through glass, and then injected into the jugular vein of 1 sheep, they failed to produce symptoms.

This nematode was present in all of the screenings that appeared to cause trouble but could not be found in the rye grass seeds obtained from rye grass stubble fields. With the exception of one farm, the trouble that appeared on rye grass stubble and rye grass screenings would not appear serious enough to cause losses. On one farm where the trouble appeared in purebred beef bulls that had been on rye grass screenings and straw for three

months, losses were extreme. Eight mature bulls and 2 cows died. The herd of cows numbered about 75 head and were fed rye hay with the screenings rather than straw.

These animals showed symptoms in every way similar to those exhibited by the cattle on chewing fescue screenings, but careful examination of the rye grass screenings failed to reveal fescue seeds. It was learned that the bulls in this herd had shown some symptoms when on rye grass stubble before being fed screenings. Examination of the heart and liver of 1 of the dead animals failed to reveal anything characteristic. Small hemorrhages were found under the serous membranes. Some inflammation of the digestive tract was present, and the liver in some cases appeared congested and firmer than normal. Experimental animals that were fed were not treated. Treatment of naturally occurring cases in sheep using vitamin B_1 seemed to hasten recovery but, as in the cattle treated, this could not be determined with certainty.

A similar trouble had been reported in other countries by Mullins[1] and McDonald.[2] In New Zealand, Hopkins[3] reports similar symptoms in animals as due to ergot poisoning. A large amount of rye grass seed containing about 9 per cent ergot was fed to sheep and no symptoms appeared. During the winter, cattle showing typical lesions of chronic ergot poisoning were found in the Willamette Valley, and these animals were on rye grass screenings. The symptoms were so characteristic that the diagnosis was confirmed by the finding of ergot in the screenings. In this herd of dairy cattle, 5 animals died. Typical necrosis of the feet and tails were seen.

DISCUSSION

It is difficult to arrive at any definite conclusion as to what might be causing the condition studied in these cattle and sheep. One can conclude that the trouble is found in cattle and sheep on rye grass stubble, and also appears in those fed chewing fescue screenings badly infested with nematodes.

The symptoms exhibited would indicate a neurotoxin. Careful examination of the literature failed to reveal any mention of trouble following the feeding of nematode-infested grass seeds. Since ergot was not found in much of the screenings that were being fed, it was impossible to believe that ergot could be involved as the cause. Further investigations are in progress.

It is quite possible that other weed seeds from plants grown in these pastures can produce the disorder. In one section of the state, McCulloch[4] reports losses in cattle, horses, and hogs, as a result of eating the seeds of *Amsinckia intermedia*. This plant is commonly called tarweed. Until it was proved that feeding of the seeds of this plant would cause trouble, it was not listed as a poisonous plant. Seeds of one of the members of this same family have been found in some of the screenings. The symptoms exhibited by the animals under investigation are somewhat similar to those exhibited by animals feeding on the *Amsinckia intermedia*.

Rye grass seed, badly infested with the fungus *Phialea temulentum*, has been suspected by Wilson[5] as a possible cause, but our feeding trials with badly infested rye grass seed failed to produce trouble in sheep.

This problem has become an important disease problem in the Willamette Valley, inasmuch as a large part of the land in this valley is used to grow grass seeds. Experiments will have to determine just what amounts of these screenings and pastures can be used without losses.

SUMMARY

Cattle fed pea vine ensilage made from pea vines grown in fields where nightshade (*Solanum nigrum*) was grown developed marked nervous symptoms.

Evidence has been obtained that losses occur in cattle and sheep that are fed fescue screenings infested with plant nematodes.

Evidence has been obtained that animals on rye grass stubble often suffer from a peculiar nervous disorder.

Feeding trials in sheep with infested fescue screenings resulted in losses.

Feeding trials with rye grass screenings failed to cause losses in sheep.

Feeding trials in sheep with ergotized rye grass seed failed to cause losses.

Feeding trials with fungus-infested rye seed failed to cause disease in sheep.

The feeding of clean fescue seed failed to produce the disease in sheep.

The cause or causes for the above described disorders has not been found.

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Diagnosis of Diseases of the Urinary Tract of the Dog

DAVID L. COFFIN, V.M.D.

Boston, Massachusetts

THE PROBLEMS confronting us in the diagnosis and differentiation of diseases of the urinary tract are many. Unless they are solved, it is impossible to adequately perform our professional duties to our community. These problems are: (1) locating the disease within the urinary tract; (2) differentiation, within limits, of the type of disease; (3) determining the effect of the disease on the patient; and (4) plotting the most effective treatment or alleviation of the condition. Because complicated kidney function tests are not possible in dogs, the practitioner must rely on his skill in observation of naturally occurring symptoms. These signs must then be correlated with the results of a few simple laboratory tests, so that an approximation of the animal's disturbed physiology may be achieved. Therefore, a challenge to our acumen in practice is presented by diseases of the urinary tract.

How then can the veterinarian cope with this problem? He must employ care and objectivity in eliciting histories and observing clinical symptoms. The use of certain laboratory procedures are essential. However, laboratory findings should be looked on as symptoms to be evaluated and correlated with clinical symptoms. The test results should never be considered infallible and all-important in themselves.

And—most important of all—accurate diagnosis, prognosis, and treatment of diseases of the urinary tract are predicated upon thorough knowledge of the anatomy, physiology, and pathology of the region. Without this background, the most accurate observation and complicated laboratory procedures are worthless.

The gross structure of the urinary tract is so well known that it requires little mention. The urinary tract consists of the kidneys, the kidney pelves, the ureters, bladder, and urethra. Adjacent structures such as the prostate, uterus, and vagina should be considered, since disease in any of these organs sometimes simulates urinary tract disease. The kidney plays an active rôle in urinary secretion. The remainder of the tract plays a passive rôle in conveying, storing, and voiding the urine. The functional unit of the kidney is the nephron. This consists of the capsule of Bowman with its enclosed glomerular tuft and the uriniferous tubules. The blood supply is common to both the glomerulus and the tubule. This fact probably plays a part in the diffuse effect of kidney lesions.

According to modern concepts, urine formation is the result of simple filtration of blood plasma through the glomerulus and selective resorption of the filtrate by activity of the tubule. It is only through a knowledge of this filtrating action that proper interpretation can be placed upon the relative rôles of prerenal (extrinsic) and renal (intrinsic) causes of urinary insufficiency. (Notice I use the term "urinary insufficiency" here and reserve the use of "renal insufficiency" for proved cases of kidney disease.) This phase of renal physiology is so important to an understanding of disease processes that a thorough review seems appropriate.

RENAL PHYSIOLOGY

The forces operating in glomerula filtration are: blood pressure in the efferent artery; osmotic pressure of the blood plasma; and capsular pressure within the glomerulus. These forces do not operate in conjunction but in opposition. The blood pressure is positive, while the osmotic pressure of plasma and the capsular pressure are negative. It has been estimated, through experimental procedures on various animals, that the mean glomerular blood pressure is one-half the mean systemic pressure. Table 1 shows relative pressures that have been estimated for man.[1] These will serve to illustrate the physical mechanism of filtration in any mammal.

Therefore, $45 - (24 + 15) = 6$ mm.[1] of effective filtration pressure. (This filtration pressure can be increased somewhat by constriction of the efferent arteriole; beyond this, there appears little significant variability for any given blood pressure.)

It can be seen, therefore, that factors of a prerenal nature can limit the efficiency of kidney function. These are conditions causing reduced glomerular blood flow; conditions lowering glomerular blood pressure; and conditions causing increased blood osmotic pressure.

Pathologist, the Angell Memorial Animal Hospital; research fellow in pathology, Harvard Medical School; research fellow in pathology, Children's Hospital, Boston, Mass.

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Thus, reduced glomerular filtration is seen in cardiac decompensation, excessive blood loss, traumatic shock, other shocklike states or collapse in infectious disease, and hemoconcentration due to shock or dehydration (prerenal deviation of water). These factors tend to cause an increase in nitrogenous waste products in the blood (increased nonprotein nitrogen, urea nitrogen, creatinine, etc.) in individuals with normal kidneys. Furthermore, in these conditions, additional elevation of nitrogenous wastes may occur from the result of increased production of such material, either due to aggravated protein catabolism, because of dehydration, fever or other disease, or by absorption of protein end products from the alimentary tract following a heavy meat meal or massive hemorrhage into the intestine or gut. Therefore, symptoms resembling uremia can be seen in diseases other than renal. This state is sometimes referred to as pseudouremia.

RENAL INSUFFICIENCY

What are the factors causing true renal insufficiency or uremia as opposed to pseudouremia, and how may they be distinguished? This is the important decision—in the vernacular, the "64 dollar question."

In the acute nephritides, it is doubtful whether there is often sufficient renal dysfunction to produce death from true uremia. However, due to dehydration, shock, excessive protein catabolism, plus partial kidney insufficiency, very high blood N.P.N. (nonprotein nitrogen) or urea nitrogen occur with symptoms resembling true uremia.

The most important differential feature (aside from a clinical evaluation of the animal) is a measurement of the concentrating properties of the kidney. In other words, can or does the kidney have the power to concentrate the urine above the density of the plasma dialysate? This, then, narrows down to an estimation of tubular function. The importance of this measurement, when interpreted with other urinary and blood changes, cannot be too strongly emphasized. The tubules normally perform an almost 100-times concentration of the glomerular filtrate. The resultant urine is, in normal animals, entirely compatible with the water intake. (Water is produced from intake of fluids; water contained in solid foods; and water derived from oxidation within the body.) Thus, an animal with a restricted water intake will have a concentrated urine, while one drinking a large amount of water or eating much food with a high water content will have urine of a dilute nature. Normal animals can vary the urine density between wide limits, for example, 1.003 to 1.060, depending on the fluid intake. Normal ranges for specific gravity commonly given for a species are the usual ranges for normally hydrated animals. Animals tend to maintain their fluid intake within this range. However, it may be entirely physiologic for an animal to produce urine below the usual range under unusual circumstances of water intake.

Due to the close anatomic relationship of the various portions of the kidney, and the fact that the blood supply is common to both the glomerulus and the tubules, most kidney lesions affect not one structure alone, but all functional elements. Therefore, despite the type of lesion predominating (glomerular, interstitial, or pyelonephritis), tubular dysfunction is a fact in the insufficient stage. Tubular deficiency is thought by some to play the major rôle in renal deficiency, even in chronic glomerular nephritis. This disease is exceedingly rare or absent in the dog.[2] The cardinal sign of tubular deficiency is the inability of the individual to regulate the density of the urine to conform to his water intake. The inability to concentrate urine is first lost. This occurs before increased blood urea nitrogen and other signs of renal deficiency are seen. Eventually, specific gravities compatible with a simple dialysate of plasma occur regardless of the state of hydration. At this stage, ability to dilute the urine too is lost so that the density is fixed within narrow limits—1.008 to 1.012 specific gravity, and elevated urea nitrogen and creatinine levels show irreversible uremia.

TABLE 1—Relative Pressures Estimated for Man

Glomerular blood pressure	45 mm.
Osmotic pressure of plasma	24 mm.
Capsular pressure	15 mm.

LOCATING THE DISEASE WITHIN THE URINARY TRACT

The clinical symptoms of the diseases of the urinary tract must serve as the basis for building a diagnosis. The relation of the symptoms to the lesions has been discussed previously.[3] Presupposing that clinical symptoms have been evaluated, the possibilities of laboratory findings are: (1) changes in the density of the urine in chronic renal insufficiency; (2) presence of an inflammatory exudate (albumin and leucocytes) in inflammatory processes of any type; (3) presence of blood (erythrocytes and albumin) in traumatic disturbances such as urinary calculi; and (4) suppression of urine formation in obstructive diseases.

DIFFERENTIATION OF THE TYPE OF THE DISEASE

It is generally possible, through correlation of the clinical and clinical laboratory findings, to ascertain the anatomic site of the disturbance even though a complete differentiation of the disease may be impossible.

In general, acute kidney disease produces more coaguable protein (albumin) in relation to sediment than postrenal diseases. The sediment in acute renal disease, which is generally interstitial in type in the dog, usually contains a preponderance of lymphocytes over neutrophils. Casts are usually present in significant numbers. The density of the urine varies with the total functional capacities of the kidneys. If there is severe impairment, the specific gravity tends to be lower than the hydration of the animal would suggest. In less severe impairment, the specific gravity is well within normal limits and, if many prerenal impairment factors are operating, may even be rather high.

There is usually some nitrogenous waste retention as measured by the blood. Nonprotein nitrogen or urea nitrogen levels and the creatinine may or may not be elevated.

It is difficult to correlate the degree of albuminuria or sediment with the degree of nitrogen retention, since severe focal changes will strongly influence the former and have little effect on the latter; whereas, a less severe diffuse change may cause severe renal impairment with less alteration of the urine. Most of the acute diffuse nephritis seen at the Angell Memorial Animal Hospital appears to result from leptospirosis. The importance of this lesion is now well known.[4]

In chronic kidney disease, true renal insufficiency usually develops before frank symptoms are noted. Thus, the animal is usually presented because of polyuria or with symptoms of incipient or advanced uremia. The urine is nearly always clear and dilute, more dilute than the animal's hydration should account for, and usually contains a slight-to-moderate amount of protein and scanty sediment. In the earlier phases, there is polyuria. Later, when terminal uremia is evident, urine volume may be low even though the specific gravity is still fixed at a low point.

In acute postrenal inflammation, the sediment is proportionately heavier than the degree of proteinuria. The sediment usually contains a preponderance of neutrophils. Bacteria are nearly always present in large numbers. A careful study of the sediment will help to locate the site of postrenal disease since, with practice, cells from the bladder, kidney pelves, and other locations may be recognized with fair accuracy. Aside from calculi, which often produce hemorrhage, obstructive disease produces little alteration in the character of the urine, except for suppression. Here clinical observation must play the major rôle.

THE EFFECT OF URINARY TRACT DISEASE

Renal and postrenal diseases damage the host in several ways. In acute renal disease, there may be urinary insufficiency through the operation of prerenal factors as well as true renal factors. Furthermore, if the acute nephritis is the result of systemic disease, as in leptospirosis, the veterinarian has to contend with these systemic effects as well. In chronic renal disease, the host shows discomfort due to polyuria (the result of inability to concentrate the urine) and disease due to renal impairment. These effects can be measured by urinalysis with special attention to specific gravity determination and measurement of the N.P.N., urea nitrogen, or creatinine levels of the blood, and by means of careful clinical observation for symptoms of uremia.

In postrenal disease, there is usually no urinary insufficiency unless there is frank obstruction to urine outflow. The damage to the host is most often the result of discomfort due to local irritation, or illness due to infection. The polyuria seen in cystitis is a reflex polyuria and is characterized by an increased frequency of urination, rather than an increase in total volume of urine output or a lowering of the specific gravity. This is not to be confused with the true polyuria of chronic renal impairment.

PLOTTING THE EFFECTIVE TREATMENT IN URINARY TRACT DISEASES

Detailed treatment is not within the province of the clinical pathologist. It seems within the scope of laboratory medicine, however, to point out a few basic facts which have a bearing on the successful handling of such cases.

In acute nephritis, recovery is possible if the animal does not succumb to urinary insufficiency or the result of systemic disease. Therefore, rational treatment must consist of treatment of the specific disease (if present) and correction of the contributory prerenal factors by correcting fluid balance.

In chronic nephritis, no recovery is possible, since the lesion is not reversible. Thus, no true recovery can take place. However, since extra renal factors (such as

prerenal deviation of water in states of dehydration) play a significant rôle, symptoms in certain cases can be alleviated for variable periods by attention to water balance, diet, and correction of intercurrent disease. Consequently, the balance between nitrogen intake and nitrogen elimination is maintained for a time, even though the kidneys are impaired as shown by polyuria and low-urine specific gravity. It must be remembered though that the lesions are progressive, and death from uremia is inevitable if the animal survives other disease.

Surgical and endocrine therapy in obstructive disease are beyond the scope of this paper. The treatment of bacterial disease should be mentioned, since it is obvious that the first step in such treatment is bacteriologic diagnosis. Bacteria inhabiting the urinary tract are peculiarly vulnerable to certain specifics such as the antibiotic agents. A very high concentration of these drugs can be maintained in the urine, because the kidney is the organ of their elimination from the body. Therefore, an approximate classification of the organism by morphology and Gram's staining is a prerequisite to rational selection of the pertinent antibiotic or other specific. For most purposes, stained smears of urine sediment are of more value than cultural studies, since rapidly growing saprophytes may predominate in cultures.

CONCLUSION

In conclusion, it must be stated that there is no substitute for cerebration in the diagnosis and treatment of urinary tract diseases. The laboratory findings in various conditions should not be merely tabulated and applied by rote. The diagnosis should be built upon a careful clinical analysis. Clinical pathology is essential for the detection of the more occult symptoms. Finally, the use of laboratory aids is conducive to understanding of the underlying anatomy and pathologic physiology of the diseases of the urinary tract.

SUMMARY

Knowledge of anatomy, physiology, and pathology of the urinary tract are prerequisites to diagnosis.

The functional unit of the kidney is the nephron which produces urine by a process of filtration and selective absorption.

The remainder of the urinary tract is concerned in collecting, storing, and voiding the urine.

The rate of urine excretion is dependent on prerenal factors as well as intrinsic renal factors. Extrinsic effects (cardiac output, blood pressure, splanchnic congestion, and fluid balance) must be evaluated before attributing apparent insufficiency to kidney change. Renal performance is affected intrinsically by the number of functional glomeruli, efficiency of individual glomeruli, and the number and efficiency of the tubules.

Postrenal disease does not lead to urinary insufficiency, unless there is obstruction to urine flow or extension to the nephron.

Renal conditions produce disease by retention of waste products. Postrenal conditions cause disease by the general effect of inflammation or by irritative changes.

Interstitial nephristis occurs commonly in dogs. Leptospirosis causes characteristic kidney disease and may be responsible for much of the interstitial disease seen. Other forms of kidney disease occur and should not be overlooked.

It is well known that old dogs frequently have chronic nephritis. However, many aged animals have normally functional kidneys and many young animals die in renal insufficiency.

Clinical pathology procedures are helpful in diagnosis. They accustom one to think in scientific terms, to observe objectively, and to reason honestly during diagnosis and treatment.

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Mandibular Dystrophy

Goats deprived of sunlight for long periods may suffer from an osteodystrophy uniquely involving the lower jaw. Prommier (*Rec. Méd. Vét.*, Nov., 1948) describes cases in which prehension and mastication, even of tender forage, were completely suspended on account of pain and in the total absence of any sign of ill health. The rami, from temple to symphysis, were pliable without any detectable sign of softening in the other bones. The condition responded completely in two weeks to outdoor life, tricalcium phosphate, vitamin D, and soupy foodstuffs. The author regards the condition comparable to osteodystrophic ailments of hogs kept in dark places.

Observations in Treating Canine Filariasis

FRED J. KINGMA, D.V.M., M.S.

Columbus, Ohio

ONE OF the most obscure phases of the study of canine filariasis is its treatment. This may be due largely to the difficulty in obtaining concrete evidence of a successful treatment following injections with an antifilarial compound. When treating for intestinal parasites, the parasites are usually expelled. However, after treating for filariasis, there is only the possibility of no longer finding microfilariae in the blood stream. There is some question about this being reliable evidence of successful treatment.

The literature is vague about how long treatment with an antifilarial compound should be continued. Schnelle[1] makes a point of this in his discussion of treatment for filariasis. At present, treatment is usually continued until microfilariae disappear from the blood stream.[1] Recent work points to the fact that the microfilariae and the adult forms may not be similar in susceptibility to various antifilarial compounds.[2] Because of this, a few years ago we at the Veterinary Clinic at The Ohio State University began treating canine filariasis by using a slightly different dosage scale than that recommended by the manufacturers of the drug used. This different regimen, however, brought up definite problems in toxicity to the drug. The followng observations were made on approximately 40 dogs which were treated in the clinic for filariasis. The drug used was sodium antimony - biscatechol - disulfonate of sodium (fuadin*). All injections of fuadin were given intramuscularly. Table 1 shows the starting dosage used.

ADMINISTRATION OF FUADIN

It will be noted that there are several differences between this dosage scale and the one commonly used: (1) The starting doses are slightly larger and the division into weight groups is based on even multiples of 10 lb. of body weight; (2) there is a uniform 0.5-cc. increase in the initial doses for each advancing weight group; (3) we do not skip a day of treatment, after dosing for a six-day period, and the beginning dose is given daily for seven, rather than six, days; (4) our procedure, after each seven days of treatment, is to increase the dose by 0.5 cc. with each succeeding week of treatment for all weight groups; (5) there is a definite time at which therapy is discontinued. As mentioned earlier, one of the vague points in fuadin therapy is the duration of administration of the drug. The end point which we have employed is the time at which the animal shows severe toxicity to the drug. Although, almost invariably the blood becomes negative for microfilariae previous to the appearance of toxicity in the dog, the drug is continued until such symptoms do appear. It is felt that this method is more likely to destroy the adults which are the source of the difficulty. The author doubts that the microfilariae alone cause a systemic disturbance noticeable to an owner.

There were several reasons for altering the manner of dosing fuadin in recent years. One was to reduce the time the animal must remain in the hospital during the course of treatment. Formerly, the average time a dog with filariasis spent in the clinic was six to eight weeks; at present, it is approximately three to four weeks. The rationale of skipping a day of treatment after each six-day treatment was questioned. It was felt that we were attempting to build up a level of the antimony-containing compound which would be toxic to the adult parasite. Skipping a treatment at seven-day intervals allows the animal to lower the level of the drug in its body tissues and it takes a longer period to again attain a suitable level. We realize that building up the level of antifilarial compounds might be done too rapidly to be effective in killing the adult, but we did not feel that we were doing this while employing the previously mentioned dosage scale.[2]

TOXICITY OF FUADIN

The symptoms of fuadin toxicity are: loss of appetite, frequent and increased urination, occasional vomiting, depression, diarrhea, edema of the lips, extreme swelling of the scrotum in males, muscle soreness, and, invariably, considerable loss in weight. Large dogs (50 lb. and over) have shown as much as a 3-lb. weight loss in twenty-four hours at the time of reaction. Smaller dogs frequently lose from 1 to 2

Chairman, Department of Veterinary Physiology and Pharmacology, College of Veterinary Medicine, The Ohio State University.

Presented before the Section on Small Animals, Eighty-fifth Annual Meeting of the American Veterinary Medical Association, San Francisco, Calif., Aug. 16-19, 1948.

*Winthrop-Stearns, Inc., New York.

lb. in twenty-four hours. Although there is commonly an initial weight gain the first week of treatment, there is usually a gradual loss previous to the time of reaction.

The fact that fuadin was given until severe toxicity symptoms occurred was dangerous to the affected animal. With this in mind, a method was devised whereby the oncoming reaction could be predicted a day or two in advance of the time it was apparent clinically. The method entails a study of the blood cell changes which occur during the course of treatment. Before treatment, a few blood counts are made to establish a normal count for the dog. It is the total leucocyte count in which we are particularly interested. A leucocyte count much above 15,000 per cubic millimeter is rarely seen before treatment. Subsequent blood counts are made at intervals of approximately three to four days, and if an increase in the total leucocyte count occurs, daily samples are taken. Of special significance in the method of predicting the oncoming reaction is the great leucocytosis which occurs a day or two before the animal shows symptoms of toxicity. A total leucocyte count may go from 15,000 to 30,000 per cubic millimeter in twenty-four hours. It is not infrequent for the leucocytes to double, triple, or even quadruple in twenty-four to forty-eight hours before the reaction is apparent by clinical examination of the dog. Practically the entire increase can be attributed to the increase in segmented and nonsegmented neutrophils. Little significance is attached to the other cells, although the eosinophil count is usually high before treatment and generally recedes when treatment is completed. The eosinophilia is apparently a common phenomenon in filariasis.[3] The erythrocytes show no great changes, although they more commonly decrease than increase in number.

TABLE I—Initial Dosage Scale of Fuadin in the Treatment of Canine Filariasis

Weight of dog (lb.)	Amount of fuadin
20 (or less)	½ cc.
20-30	1 cc.
30-40	1½ cc.
40-50	2 cc.
50 (and more)	2½ cc.

As soon as the reaction is manifest, further injections of fuadin are discontinued and the animal is given large quantities of fluids such as normal saline, dextrose in saline, and, possibly, an amino acid solution if the weight loss has been above average. These fluids are given intravenously, subcutaneously, and, sometimes, intraperitoneally. The amino acid preparation is given slowly, intravenously. The amounts of fluid given are figured on the basis of the body

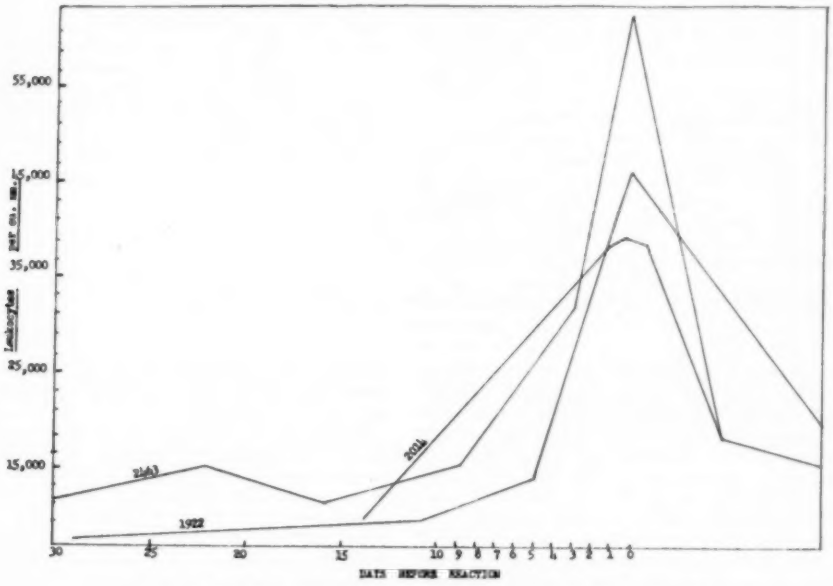

Fig. 1—Typical leucocyte counts in dogs undergoing fuadin treatment.

weight of the animal. From 250 to 500 cc. are given twice daily. In large dogs, these amounts may be increased. Fluid therapy is continued until the appetite returns to normal—usually from one to three days. The blood picture is usually back to almost normal in two to four days. There have been a few cases where the leucocytosis has continued to increase the day after cessation of treatment. This is not frequent, however, as almost invariably the forcing of fluids and the cessation of treatment rapidly restore the leucocyte count to normal. None of the cases reported here have succumbed to fuadin treatment since this regimen was initiated.

The blood is examined for microfilariae at weekly intervals during the course of treatment. Until a month ago, the samples have always been found negative prior to the onset of the reactions. At that time, we treated a Pointer who showed toxic manifestations following one week of treatment. He had to undergo a repeat treatment. We believe that treatment should

DISCUSSION

It is difficult to make deductions from a clinical study of this type. However, we are trying to look at this problem from the viewpoint of the average practitioner faced with the problem of treating a dog for filariasis. We have attempted to contact owners of dogs subjected to a successful course of fuadin treatment, *i.e.*, disappearance of the symptoms for which they were presented. If lameness was present, it was rectified following a course of fuadin therapy; if a cough was present, it disappeared; and if the dog could not, or would not, perform in the field for more than a short time, it performed well after treatment. It is this last condition which is the chief complaint in the sporting dogs presented for treatment. Clinically, we have been satisfied with fuadin treatment. Possibly, the fact that we actually attempt to produce symptoms of toxicity and thereby produce a rather high concentration of the drug in the animal's tissues has been a factor contributing to the acceptable clinical results.

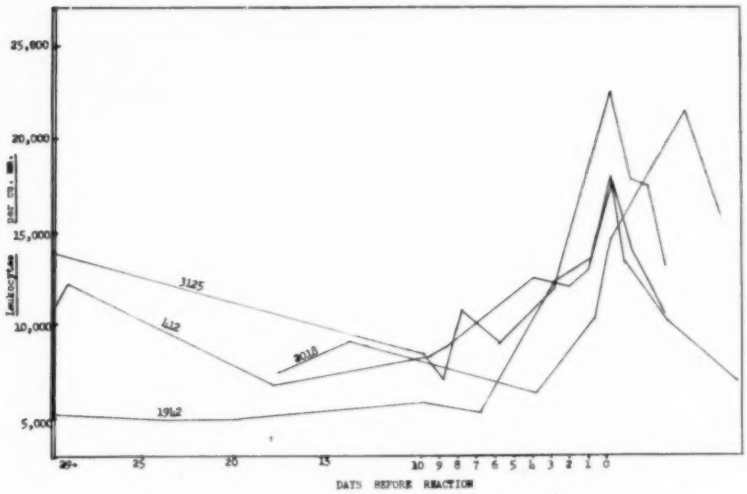

Fig. 2—Typical leucocyte counts in dogs undergoing fuadin treatment.

be continued in spite of this finding since we feel that the adult parasites, rather than the microfilariae, are responsible for the symptoms that have caused the owner to present the animal for diagnosis and treatment. The question has not been adequately settled as to the comparative susceptibility of the adult and the microfilariae to fuadin. Because of this, it is felt that a more successful treatment will be promoted by continuing fuadin until the animal shows the reaction.

In only one instance were we unable to render the blood free of microfilariae before the reaction occurred.

Since this is a report of clinical observations of filariasis treatment, is is impossible to determine how effective fuadin has been in actually destroying the adult parasite. Experimental evidence indicates that the usual dosage methods for antimony-containing compounds will not regularly kill the adult filaria.[2] Because of that, scientists have worked diligently to produce an

antifilarial compound which is superior to the antimony-containing compounds. A stimulating factor to this search is the ever-increasing evidence of filariasis in the American human population.[4]

There are two main groups of chemicals which have been used experimentally in these studies. In May, 1947, the effectiveness of a group of cyanides was reported. One of the drugs (chemotherapy center No. 863) was effective in overcoming filarial infestation in rats.[5] Since that time, however, the author of this publication has stated that this drug was disappointing in the treatment of filariasis in dogs. It failed to kill the adults, and they were able to produce microfilariae a short time after the drug was discontinued.[6]

In August, 1947, another group of antifilarial drugs was reported.[2] The drugs discussed in this report are substituted phenyl arsenoxides. One compound, designated "tropical disease center No. 970" was found to be effective in the treatment of *Dirofilaria immitis* in dogs. According to Dr. G. F. Otto of Johns Hopkins University, this compound, in doses which are considerably below the dose toxic to dogs, will destroy the adult parasite. He suggests that it be given intravenously in doses of 2.25 mg. (0.45 mg. As) per kilogram of body weight daily for two weeks.[7] Dr. R. J. Jackson, a veterinarian from St. Augustine, Fla., has treated approximately 40 dogs with this medicant and will report his results in the near future.[8] If the results are as promising as Dr. Otto indicates, there is every possibility that this drug may be used commonly to treat filariasis in the dog. It has been given the nonproprietary name of arsenamide.[10]

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Chicken Mites Carriers of Encephalitis Virus

In studying the epidemiology of sporadic cases of encephalitis in children at Shelbyville, Tenn., Howitt, Dodge, Bishop, and Gorrie (*J.Am.M.A.*, Feb. 19, 1949) recovered the virus of equine encephalomyelitis virus (eastern strain) from a pool of 300 chicken mites (*Dermanyssus gallinae*) removed from a chicken house. The authors also recovered the virus from a mixture of chicken mites and lice. Neutralizing antibodies were found in the serums of chickens and 1 cow. Proof that these arthropods were the vectors of the cases investigated was not claimed, but the finding conforms to the presence of neurotropic viruses in chicken mites demonstrated by others in recent years.

The Tsetse Fly in Africa

Several millions of square miles of tsetse fly-ridden territory in Africa and other tropical regions may be made more livable for domestic animals through use of a new drug called antrycide,* developed by British chemists and biologists.

A single subcutaneous injection of this drug is said to protect cattle, swine, horses, pigs, camels, and dogs against certain forms of trypanosomiasis, including *Trypanosoma congolense*, *Trypanosoma vivax*, *Trypanosoma brucei*, *Trypanosoma evansi*, and *Trypanosoma simiae*. Single doses of the drug also are reported to have effected "a proportion of cures" in established cases (*Nature*, Jan. 15, 1949).

Field tests are now being made by veterinary research men in a settlement on the Nairobi-Mombasa road in Kenya, and it is hoped that these tests will determine the duration and character of the drug's prophylactic action, particularly with reference to cattle. If the reported value of the drug is confirmed by the field trials, it may be possible to make a much needed expansion in meat and milk production throughout the infested areas in Africa. This could be done by importing high-producing breeds of cattle which have been unable to survive in the bush country because of the prevalence of the tsetse fly which spreads trypanosomiasis. Cattle now raised there are native dwarf breeds which are unproductive though relatively resistant to this disease.

A statement released Dec. 30, 1948, by the British Colonial Office declared that antrycide has no toxic or other undesirable effects.

*4-amino-6-(2'-amino-6'-methylpyrimidyl-4'-amino) quinaldine-1:1'-dimetho salts; Imperial Chemical Industries, Ltd., Manchester, England.

NUTRITION

Riboflavin and the Control of Equine Periodic Ophthalmia

MAJOR T. C. JONES, V.C., U.S. Army

Washington, D. C.

THE RELATION of nutrition to equine periodic ophthalmia has been discussed previously in a series of papers[1-3] based on experimental work conducted in the Army Veterinary Research Laboratory when it was located at Front Royal, Va., and later at Fort Robinson, Neb. It was demonstrated that the addition of riboflavin to the ration of normal horses prevented the appearance of new cases of the disease. However, no change in the course of the disease was observed in animals which presented symptoms at the time riboflavin supplementation was started. The purpose of this paper is to report additional clinical experience with this method of control of equine periodic ophthalmia.

PERIODIC OPHTHALMIA IN AN ARMY REMOUNT DEPOT

The addition of riboflavin to the ration, as described previously,[2] was started in 1943 at the Aleshire Quartermaster Depot (Remount), Front Royal, Va. (formerly the Front Royal Quartermaster Depot), and continued during 1945, 1946, and 1947. In one group of approximately 125 horses, in which there was a very high incidence of new cases of periodic ophthalmia during 1943, the addition of 40 mg. of crystalline riboflavin daily to the ration of each horse during 1944 resulted in the reduction of that incidence to zero. In control groups of horses not receiving riboflavin, new cases of periodic ophthalmia continued to appear during 1944. This experiment is illustrated in chart 1. It will be seen that, although the mean daily strength was 110 during 1943 and 126 in 1944, the incidence of new cases of periodic ophthalmia was zero in 1944 in contrast to 110/1,000 in 1943. This striking reduction in new case rate could not be explained on any other basis and encouraged the further feeding of riboflavin.

Consequently, riboflavin was added to the ration of all the horses at the Front Royal Remount Depot, starting early in 1945 and continuing to the present writing. For convenience in feeding a large number of horses, riboflavin was mixed thoroughly with wheat bran at the rate of 40 Gm./

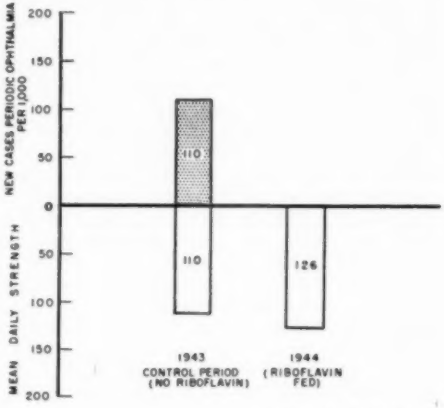

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Chart 1—Experimental use of riboflavin to control outbreaks of periodic ophthalmia.

1,000 lb., and each horse was allotted 1 lb. of bran per day, this amount containing 40 mg. of riboflavin. A graphic presentation of this method is given in chart 2. The method has several advantages: Riboflavin mixes and adheres well in bran, and the amount for each animal can easily be regulated. Stallions and brood mares often received 2 lb. of bran, thus providing an increased amount of riboflavin at crucial times. Animals on lush pasture, rich in legumes, were not fed bran, since riboflavin supplementation was not considered necessary when their natural diet was so satisfactory, and, in fact, most horses refused to eat grain under these circumstances. As soon as pasturage became short, grain feeding and riboflavin supplementation were resumed.

Presented before the Section on Surgery and Obstetrics, Eighty-fifth Annual Meeting, American Veterinary Medical Association, San Francisco, Calif., Aug. 16-19, 1948

The effect of riboflavin supplementation on periodic ophthalmia in all the Army horses at Front Royal is indicated in chart 3. Although the number of new cases had always been disturbingly high at this remount depot, the incidence dropped to zero after riboflavin was regularly added to the

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Chart 2—Method of feeding riboflavin by mixing with bran.

ration. The data for the years 1941 and 1942 do not include cases of the disease occurring in privately owned officers' mounts, while the figures for the remaining years include privately owned mounts maintained at the Depot; therefore, the incidence figures in this chart for 1941 and 1942 are somewhat lower.* It is apparent that the annual incidence of periodic ophthalmia reached a peak of 50/1,000 mean strength in 1943 and was still 40/1,000 in 1944; but, after the use of riboflavin was started, it became nil and remained so during 1945, 1946, and 1947. The mean animal strength also dropped after 1943, but this in itself would have no important effect on the incidence of periodic opthalmia.

It must be reëmphasized that this striking effect is only on the incidence of *new* cases of the disease. Animals which have already shown symptoms before riboflavin feeding is begun usually do not improve; recrudescences may be expected, and complete blindness may eventually result. The absence of new cases of the disease among normal horses is the only effect observed.

PERIODIC OPHTHALMIA ON A CIVILIAN FARM

Early in 1945, our attention was directed to a particularly severe outbreak of periodic ophthalmia in a civilian institution.** Examination of all horses on this farm on February 22, 1945, revealed an unusually high rate of 269/1,000, in that 25 out of 93 horses were affected with the disease. The situation was particularly critical among the 2-year-olds; 14 out of 19 animals were affected (73.9%). Most of these affected colts were blind in one or both eyes before reaching their second year. Because of the devastating effect of periodic ophthalmia in this establishment, a careful study of all influencing conditions was undertaken.

Several special conditions were noted which may have had a bearing on the incidence of periodic ophthalmia. All of the forage, with the exception of a small amount of concentrates (particularly linseed meal and bran), was produced on the Institute farm of about 2,300 acres. Most of the hay was grown on bottom lands which were inundated by the James River in flood periods. The long forage (Johnson grass, alfalfa, and oat hay) was cured in the field, and heavy rainfall often made

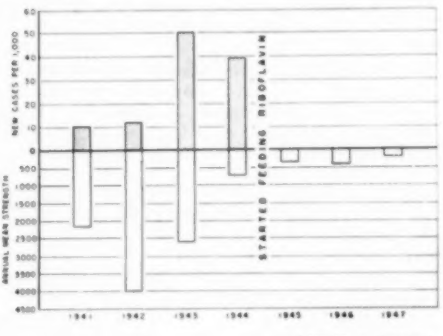

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Chart 3—Effect of riboflavin on incidence of periodic ophthalmia at Front Royal.

the process of curing difficult and unsatisfactory. Badly weathered forage was utilized as bedding when its condition was such as to prevent its use as feed. During 1943 and early 1944, a new attendant in charge of the horses sharply reduced the ration fed to all animals; in some instances, the hay allowance was cut from 10 to 2 lb. per day. It is believed that many of the yearling colts ate weathered and moldy bedding as a result of this reduction in suitable feed available.

Aside from its possible toxic effects when ingested, this bedding material was a poor source of riboflavin. Analyses by the microbiologic assay method revealed an average riboflavin content of 1.0 mg. in each pound of bedding. This is much less than is found in average alfalfa (7.7 mg./lb.) or timothy hay (4.26 mg./lb.). Analyses

*The assistance of Col. Floyd C. Sager, V.C., depot veterinarian, Aleshire Quartermaster Depot, Front Royal, Va., and Lieut. Col. William E. Jennings, V.C., chief of the Animal Service Branch, Veterinary Division, Surgeon General's Office, Washington, D. C., in assembling these data is gratefully acknowledged.

**Our gratitude is expressed to Father Denis, O.S.B., former director of St. Emma's Military Institute, Rock Castle, Va., for his active coöperation in this experiment and for his generous donation of several affected animals to our laboratory for experimental study.

of the feeds available in 1945 also revealed a uniformly low riboflavin content. This was true even in samples of forage with good physical appearance. Samples of the grain mixture averaged 1.2 mg. of riboflavin per pound, and alfalfa hay grown on the farm averaged 2.0 mg. per pound. Grain is not ordinarily a good source of riboflavin,

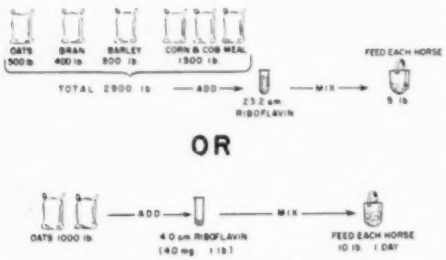

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Chart 4—Method of feeding riboflavin at St. Emma's Military Institute.

hence the riboflavin content of this feed was about average; however, the alfalfa hay was unusually poor in riboflavin. Riboflavin is frequently lost in sun-curing of hay since it is sensitive to sunlight. The low riboflavin content of forage grown in areas of heavy rainfall may be explained by the fact that this element of the vitamin B complex is water-soluble, in addition to its sensitivity to sunlight.

Based upon the experience at Front Royal, it was recommended that riboflavin be added to the feed of all horses in this civilian institution and that all affected animals be eliminated, since no hope of a cure was offered. These recommendations were followed.

Since it was already customary at this farm to compound a grain mixture at approximately weekly intervals, riboflavin could be conveniently added, as this mixture was prepared, in sufficient quantity to assure each horse an allowance of 40 mg. each day. This method of mixing the feed is illustrated in chart 4.

In any procedure for mixing, it is wise to combine the riboflavin with a small amount of the grain (or some diluent such as flour or bran), making certain that it is evenly distributed; then, this compound is added to all the other ingredients, mixing it thoroughly. If oats alone is fed, chart 4 indicates how 4 Gm. of riboflavin may be added to each 1,000 lb., giving each ration of 10 lb. of oats a total of 40 mg. of riboflavin.

The results of riboflavin supplementation in this civilian institution were equally as dramatic as at Front Royal—no new cases appeared during the succeeding eighteen months. When an inspection was made on Nov. 1, 1946, the situation had changed as indicated in chart 5. All but 3 animals with the disease had been disposed of and these 3 had failed to improve. No new cases had appeared at any time during the period, nor did any additional animals show lesions at the time of this examination. Some young animals had been sold in the spring of 1945; all were believed to have had normal eyes at the time of sale, and, as far as could be determined, none contracted the disease within the following months.

SUMMARY AND CONCLUSIONS

Experience during 1945, 1946, and 1947, indicates that addition of riboflavin to the ration is an effective means of prevention of equine periodic ophthalmia. At the Aleshire Quartermaster Depot (Remount) at Front Royal, Va., crystalline riboflavin was

22 FEB. 1945					1 NOV. 1946			
AFFECTED ANIMALS		NUMBER ANIMALS	YEAR FOALED	TYPE	YEAR FOALED	NUMBER ANIMALS	AFFECTED	
PERCENT	NUMBER						NUMBER	PERCENT
31.6	6	19	—	BROODMARE	—	15	3[a]	20.0
0	0	0	—	WEANLINGS	1946	11	0	0
0	0	14	1944	YEARLINGS	1945	[b]	0	0
73.7	14	19	1943	2 YR OLDS	1944	1	0	0
7.7	1	13	1942	3 YR OLDS	1943	0	0	0
14.3	4	28	-	4 YRS AND OVER	-	12	0	0
26.9	25	93	-	TOTAL	-	40	3[a]	7.5[a]

—*AIP Neg. 218073-4*

(a) Same cases listed in 1945; no new cases in 1946.

(b) Most of the 1945 foals were sold in April, 1946, at which time all were believed to have normal eyes.

Chart 5—Incidence of periodic ophthalmia at St. Emma's Military Institute.

added to the ration at the rate of 40 mg. per horse per day. This amount was fed during winter months when the grain allowance was ample. During the summer months, this amount was reduced or eliminated, depending on whether or not the animals were grazing on adequate pasture. Although recrudescences were observed in established cases of the disease, no new ones appeared. That addition of riboflavin will prevent the outbreak of new cases, but will have little or no effect on the old cases is, therefore, further substantiated.

In one civilian institution, the control of periodic ophthalmia by a similar change in feeding practices during 1945 to 1947 was equally effective. In this establishment of

approximately 90 horses, the disease had always been present to some extent, but a particularly devastating outbreak occurred during 1944. Beginning in 1945, riboflavin was mixed with the grain ration and fed to all animals. In the succeeding years, the disease was controlled; there were no new cases, although horses previously affected showed no improvement.

Because of these encouraging experiences, the use of crystalline riboflavin is recommended as an effective means of control of this important disease of horses.

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Distillers' solubles give better results when fed with soybean oil meal than when fed with meat scraps in the ration for hogs on pasture.—*Univ. of Illinois.*

Cobalt deficiency can be prevented by feeding clover or alfalfa, according to the U. S. Nutrition Laboratory, Cornell University.

Excesses of calcium and phosphorus, of calcium alone, or of iron in the ration interfere with the availability of manganese.—*Feedstuffs, March 12, 1949.*

Surplus colostrum diluted with warm water—2 parts milk and 1 part water—is reported to be a satisfactory replacement for whole milk for young calves.

There is growing clinical evidence that the aqueous form of vitamin A has marked superiority over the oil form in raising the vitamin A blood level.

Birds get vitamin D from swallowing preen gland oil in the course of preening, while furry animals obtain it in the oil they lick from their hair, British experiments indicate.—*Sci. News Letter, March 5, 1949.*

The clinic cannot set aside the fact that feeding is by far the biggest economic problem of the livestock farmer, and therefore connotes a closer acquaintance with the output of the commercial feed industry, as close, in fact, as knowledge of drugs.

Protein Assimilation

Recent evidence indicates that occasionally the high protein diet prescribed for the building of body resistance may be useless unless accompanied by high intake of pyridoxine. In the absence of adequate amounts of pyridoxine, the animal body is apparently unable to metabolize tryptophane. Such failure then results in convulsions and severe anemia.

Boiled Potatoes for Chickens.—Kennard, of the Ohio experiment station, Wooster, replaced 30 per cent of the regular ration of White Leghorn pullets with boiled potatoes. Egg production was equal to that of the controls, and the pullets remained in good condition. The saving was the difference between potatoes at $0.45 a bushel and feed costing $3.50 per cwt. Similar results were obtained in the feeding of broilers and growing pullets. Raw potatoes were found to be unpalatable.—*Biological Abstracts.*

Milk Output Not Raised by Vitamin E.—Daily feeding of 1 Gm. of natural mixed tocopherols for four to five weeks had "no significant influence" on milk or fat production in dairy cows, whether on winter rations or on pasture. On the other hand, daily feeding of 5 oz. of cod liver oil during the winter increased milk production 6 per cent, although it also decreased the butterfat yield about 14 per cent. The cod liver oil had a depressing effect on the carotene content of milk fat and blood plasma—an effect that was counteracted to some extent by tocopherol feeding.—*J. Dairy Sci., Feb., 1949.*

Ladino Clover for Growing Swine.—Ladino clover has higher feeding value than alfalfa for growing and fattening swine, the Indiana Agricultural Experiment Station reports. Average daily gains for pigs on Ladino was 1.8 lb., compared with 1.64 lb. for pigs on alfalfa. The regular ration for both groups was corn, protein supplement, and minerals. Ladino-pastured pigs consumed 326 lb. of feed per hundredweight of gain, while those on alfalfa required 340 lb.

The amounts of calcium, phosphorus, and protein in meat and milk are not influenced in any significant way by what the animal eats or by the soil upon which the feed was raised.—*K. C. Hamner, USDA.*

Some Nutritional Diseases of Farm Animals

L. L. MADSEN, B.S., Ph.D.

Logan, Utah

VETERINARIANS are interested in the general field of nutrition and nutritional diseases. This is natural for, as veterinarians, you are all interested in keeping livestock healthy as well as in treating them when they are sick. The accepted method for treatment of many diseases includes advice on changing or improving the diet. In some conditions, a change in diet is an important part of the treatment. I do not infer that errors in diet account for all ills, but adequate nutrition is an important asset in maintaining animal health.

Nutritional diseases are often due to a failure of the ration to supply sufficient quantities of one or more of the essential nutrients, or to a failure of the animal to utilize these nutrients. In cases where a ration is deficient in several nutrients, all of them must be supplied before optimum results will be obtained.

Many laboratory methods have been perfected for the detection of nutritional deficiencies, but the recognition of specific symptoms in animals is still the most widely used means of diagnosis. In this short review only a few of the important nutritional diseases can be discussed.

VITAMIN A DEFICIENCY

Farm animals of all ages may suffer from vitamin A deficiency, but young animals are particularly susceptible. Newborn calves have low vitamin A reserves since the pregnant mother, even on a high carotene intake, does not supply vitamin A to the fetus much faster than it is needed. Cows receiving an insufficient amount of vitamin A may abort or have calves that are weak or blind at birth. Such calves may die within a few days; however, the cows themselves often appear normal, except for a possible increase in number of retained placentas. Diarrhea (occasionally constipation), pneumonia, blindness, dilated pupils, excessive lacrimation, convulsions, kidney damage, incoördination, rough coat, failure of appetite, and slow growth or weight loss followed by death are characteristic of vitamin A deficiency in calves. Postmortem examinations on such animals usually reveal that blindness is due to a stenosis of the optic nerve, while a cystic pituitary with considerable reduction of the glandular tissue may also be found.

One of the first symptoms of vitamin A deficiency that can be detected by a careful observer is night blindness, or an inability to see well in dim light, such as during the late evening. This can be detected by driving animals about in a corral and noting if they stumble over, or bump into, objects placed in their way. Various degrees of night blindness can be detected, and the condition usually gets progressively worse. Night blindness may progress to permanent blindness, due to optic nerve injury, if the deficiency continues in young animals. Ophthalmoscopic examination of the eyes of cattle with vitamin A deficiency reveals papillary edema and bleaching of the tapetum lucidum. Blood analysis for carotene and vitamin A has also proved to be of value in diagnosing vitamin A deficiency in cattle.

Bulls may lose their reproductive ability in severe vitamin A deficiency, but damage to sexual organs is not always permanent. In a recent study, young beef bulls were subjected to a period of vitamin A depletion by feeding a ration low in carotene. It was found that "sexual activity and ability decreased rapidly with the development of symptoms of vitamin A deficiency. Semen samples, collected as the depletion progressed, showed marked increases in percentage of abnormal spermatozoa and cellular débris with progressive decline in motility.

"Injections of ascorbic acid failed to stimulate sexual activity or modify the quality of the semen produced by the carotene deficient bulls. Carotene feeding, on the other hand, restored the bulls to apparently normal activity and semen production."

Fattening and breeding cattle often develop swelling or edema of the legs, shoulders, brisket, hindquarters, and elsewhere when suffering from advanced vitamin A deficiency. This condition is called anasarca. The edema disappears quickly when a good source of carotene or vitamin A is provided.

Sheep also develop night blindness from vitamin A deficiency and pregnant animals may abort or give birth to weak offspring which die shortly afterward. Other symptoms in sheep are loss of appetite, poor condition, and weakness.

Swine show incoördination and convul-

Presented before the Section on General Practice, Eighty-fifth Annual Meeting, American Veterinary Medical Association, San Francisco, Calif., Aug. 16-19, 1948.

sions similar to calves on a vitamin A deficient diet. They also may have impairment of vision. Vitamin A deficient sows may fail completely in reproduction or give birth to blind or eyeless pigs. Other congenital abnormalities noted in young pigs born to vitamin A deficient sows are cleft palate, harelip, accessory ears, misplaced kidneys, and subcutaneous cysts.

Horses on vitamin A deficient rations have rough, scaly hoofs, a rough coat, and develop night blindness.

A lack of sufficient carotene in the diet is the most common cause of vitamin A deficiency in farm animals. Conditions under which this deficiency appears most frequently in cattle are (1) on the range during drouth; (2) in the feedlot when consumption of concentrates is high and the supply of roughage is either low or of poor quality; (3) wintering animals on low grade roughages such as straw or poorly cured hay; and (4) calves fed skimmilk or calf meals without good hay or other source of vitamin A. Good pasture or properly cured hay of the current season's crop during drylot feeding will prevent or cure this deficiency. The National Research Council recommends 5.5 mg. of carotene or 3,000 I.U. of vitamin A daily per 100 lb. liveweight for cattle for moderate storage and reproduction.

VITAMIN B COMPLEX

The number of recognized components of the vitamin B complex has increased steadily since 1926. Much is known concerning the essential nature and deficiency symptoms of these vitamins in the diet of laboratory animals and poultry. Recent studies have also shown that most of these factors are essential for normal growth and health of swine, and that a deficiency of these factors produces typical symptoms. A definite dietary requirement for the individual B vitamins has not been established for cattle, sheep, and goats; however, the existing evidence is not entirely complete.

Studies on the vitamin B complex requirement and effects of this deficiency in swine have been carried out largely with purified or restricted diets. A need for thiamin, riboflavin, niacin, pantothenic acid, pyridoxine, choline, and several other factors has been established.

Thiamin Deficiency.—Thiamin deficiency can be produced in young pigs by feeding rations deficient in this vitamin. Symptoms appear after the pigs have been on the diet for several weeks. The animals first refuse food, may vomit occasionally, and finally become emaciated. There is also a marked lowering of body temperature and pulse rate. Death usually occurs within a few weeks unless thiamin is given. On autopsy, a flabby heart and liver damage are often found. Some individuals have excessive fluid in body cavities and pathologic changes in the gastrointestinal tract. Histologic changes have been reported in the heart and liver. Electrocardiographic studies reveal a lowered heart rate and abnormalities in conduction of the heart beat.

Thiamin is also needed by sows for successful reproduction. Results of recent studies (at Washington State College) with sows on thiamin deficient diets may be summarized as follows: Gilts farrowed nine to eleven days prematurely; high mortality in newborn pigs; weak leg condition in pigs at birth; and unthrifty pigs and low weaning weights.

It is fortunate that practical swine rations are usually well fortified with thiamin when they contain a large proportion of whole grains and grain by-products.

Riboflavin Deficiency.—Riboflavin deficiency has been produced experimentally in swine by feeding rations low in this factor. The following symptoms have been noted: slow growth; frequent scours; walking with difficulty due to a crippled condition of the legs; and rough skin and coat. Failure in reproduction was also noted by the Washington State College workers. They report that riboflavin deficient gilts farrowed four to sixteen days prematurely; a loss of appetite with poor gains during gestation; pigs died at birth or failed to survive more than forty-eight hours; and abnormalities such as enlarged front legs, generalized edema, and hairlessness were evident in baby pigs.

Riboflavin may be supplied to swine in milk by-products such as skimmilk, buttermilk, and whey. Green pasture and well-cured alfalfa are also good sources. Grains are relatively low in this factor but liver meal, yeast, and dried distillery solubles are rich sources.

Recent work by the Army Veterinary Corps indicates that periodic ophthalmia, which is a troublesome disorder of horses, may be due to riboflavin deficiency. Success was reported in preventing this disease by feeding horses 40 mg. of crystalline riboflavin daily.

Niacin (Nicotinic Acid) Deficiency.—Swine require niacin, but recent findings indicate that they can apparently get along without this vitamin if the ration contains adequate amounts of the amino acid, tryptophane. Niacin deficiency is characterized by poor appetite, slow growth, frequent diarrhea, necrotic lesions in the large intestine,

and a high mortality if the deficiency continues.

Barley usually contains more niacin than corn. Fresh liver, liver meal, and yeast are good natural sources of the factor. Successful use of pure niacin in the treatment of necrotic enteritis in swine has been reported by Michigan and Pennsylvania workers and by several practicing veterinarians, but the problem is still controversial. More work needs to be done in this field in order to define more clearly the interrelationship between diet and susceptibility of swine to organisms causing necrotic enteritis.

Pantothenic Acid, Pyridoxine, and Incoordination in Swine.—As early as 1916, Wehrbein, of Iowa, described a posterior paralysis and incoördination in swine. Work in recent years by the U. S. Bureau of Animal Industry demonstrated that the incidence and severity of the disease could be increased by heating the ordinary swine ration to 115 to 120 F. for thirty to forty hours. Later work by the BAI and others showed that pantothenic acid was the preventive factor which was destroyed by heat treatment. Studies with purified diets demonstrated this relationship further and revealed that another B vitamin, known as pyridoxine, was also involved. Symptoms of pantothenic acid deficiency are striking. Pigs lose their appetite, slow up in gains, then lose weight, and die. They also have severe diarrhea (frequently bloody), loss of hair, weakness, and incoördination. Microscopic examination of the nerves and spinal cord of these animals show that they have a myelin degeneration identical with field cases of incoördination.

Pyridoxine must also be present to prevent nerve degeneration in pigs on a synthetic diet. This factor, however, does not seem to be the limiting one on natural diets. Symptoms of pyridoxine deficiency, in addition to myelin degeneration, are convulsions and the development of a severe microcytic anemia.

Barley, oats, liver, brewers' yeast, and concentrated milk products contain protective factors against myelin degeneration in swine. Treatment of pigs with incoördination is usually unsuccessful because nerves with myelin degeneration do not repair themselves to any great extent.

Choline Deficiency.—Choline deficiency has not been reported in swine fed natural rations, but from studies with purified diets it is obvious that a deficiency of this factor can readily be produced. The most striking symptom is the development of a fatty liver. Work from Washington State College demonstrates conclusively that choline is needed for successful reproduction in swine. When gilts were maintained on choline deficient diets they farrowed on schedule but there was a heavy death loss among the pigs and those that survived for a time showed leg weakness, muscular and nervous incoördination, subnormal weaning weights, and, at autopsy, typical fatty livers were found.

PHOSPHORUS DEFICIENCY

Beef and dairy cattle and sheep show symptoms of phosphorus deficiency in many areas and under various feeding conditions in the West. Typical manifestations of phosphorus deficiency include depraved appetite, emaciation, stiff joints, irregular estrus, small calf crop, and low weaning weights on calves. Studies at the Utah station show that parturient hemoglobinuria or nutritional red water, in high-producing dairy cows, responds to intravenous injections of disodium phosphate and to drenching with this material or bone meal. Reports also show that beef cattle on feed are responding to phosphorus therapy in cases of nutritional red water. This type of red water should not be confused with the highly fatal, infectious bacillary hemoglobinuria.

Livestock men in the West are beginning to depend on phosphorus supplements such as bone meal or a mixture of equal parts of bone meal and salt to prevent phosphorus deficiency.

A story about one of our Utah sheepmen illustrates this point. In 1940, he took over a sheep outfit which had failed financially. He soon noted ulcerative arthritis in his lambs. Losses varied from 50 to 100 lambs per 1,000 ewes. Losses from poisonous plants, particularly sneezeweed (*Helenium hoopesii*), also made it necessary for him to move the herd to browse about every three weeks and stay there for three or four days. He was advised to feed a mixture of equal parts of bone meal and salt. Within five or six days, losses among lambs stopped and many of the cases of ulcerative arthritis cleared up. Bone meal feeding continued and, in succeeding years, it was noted that the lamb crop increased, weaning weights were heavier, ulcerative arthritis disappeared, and gradually it became evident that it was no longer necessary to go to browse to control poisoning from sneezeweed. The sheep became more contented, grazed more uniformly, and were in better condition.

Decreasing death losses, from poisonous plants, among both cattle and sheep on the range by feeding bone meal and salt appears to be a fact from practical experience. Care-

fully controlled studies are needed, however, on this interesting observation.

SUMMARY

In this paper, I have gone into some detail concerning a few deficiency conditions which develop in animals from a lack of certain essential vitamins and minerals in the ration. Some of the things which I have stated as factual may be controversial, and newer discoveries may change the picture entirely. It is impossible to cover the entire field of nutrition in a single paper and there are many important things left unsaid. To point out a few nutritional conditions which may be seen in veterinary practice, and to emphasize the necessity of specific treatment in such cases, is the purpose for which this paper was prepared.

Dried Grapefruit as Cattle Feed.—New investigations of the value of whole grapefruit as a feed for cattle have suggested the need for dehydrating, special processing to remove the possibly harmful excess of citric acid, and fortification with some of the essential amino acids and vitamin A which it lacks. Work at Florida Southern College (*Cattleman*, Oct., 1948) showed that a ton of the dry product can be produced from about 120 boxes of fruit, and that such feed could replace a large part of corn and other feed material now imported from other states.

Dairy cows fed potatoes grown in soil treated with benzene hexachloride (to destroy wireworms) produced milk with a bitter flavor.—*J. Milk and Food Technol., Nov.-Dec., 1948.*

It was once thought that the conversion of carotene to vitamin A takes place in the liver, but newer studies (with rats) suggest that such conversion takes place in the intestinal wall.

We will have to learn more about how to use thyroid-stimulating drugs before they can become an ingredient of formula feeds. —*Lyman Peck in Feedstuffs (Oct. 16, 1948).*

Frequent clipping of Ladino clover or bluegrass sod, leaving only the tender growth, encourages poultry to eat more green feed.—*Poult. Tribune.*

Arthritis Associated with a Niacin Deficiency

Arthritis—swelling of the hock and knee joints, severe lameness, with temperatures ranging from 104 F. to 107 F.—associated with an enteritis in recently weaned pigs responded to the intraperitoneal administration of sulfonamides. The pigs, kept on fruit farms principally for fertilizing purposes, did not have access to forage. The ration was dry feed containing about 18 per cent protein without skimmilk or other farm surplus added. At first, a vitamin D deficiency was suspected but no response was received from vitamin D therapy. The response to erysipelas antiserum was also negative. The addition of a niacin-ferric compound to the ration seemed to prevent joint infections. The addition of 100 mg. of nicotinic acid to each gallon of drinking water for pigs receiving the 17 to 18 per cent protein ration until they are 12 weeks of age is now generally recommended.—*L. C. Swan in Canad. J. Comp. Med., Jan., 1949.*

NOTE.—Dr. R. A. McIntosh suggests, in an editorial comment, the addition of the entire vitamin B complex to the ration, in the belief that the other B fractions will be lacking if niacin is deficient. The use of the sulfonamides, especially sulfadiazine, for the condition is confirmed. He advances the theory that the organisms gain entrance to the general circulation through the damaged mucous membrane of the intestine and are carried to the serous membrane of the capsular ligament of the joints, thus causing the lameness.—ED.

Amino Acids for Mink.—Critically sick mink that are unable to take food often respond dramatically to amino acid injections. Oral dosage, as an adjunct to usual therapy, is sometimes indicated in cases of pneumonia, stomach ulcers, and Salmonella infections.—*Am. Fur Breed., Feb., 1949.*

Bovine Rickets.—Although vitamin D_2 is known to have advantages, vitamin D_3, given parenterally, terminates more rapidly the course of the disease. For calves, Jautard (*Thèse*, Paris, 1948) recommends D_3 in oil that titers 100,000 I.U. per cubic centimeter in doses of 5 cc. in the muscles or jugular vein, given two or three times at intervals of ten days. Inasmuch as rickets is due to faulty metabolism of calcium and phosphorus, the administration of these salts is of no avail without the activating vitamin.

EDITORIAL

Another Burden for Publications?

As if the greatly increased costs of printing, paper, and other items incident to publishing periodicals and newspapers were not already about all that can be borne and still stay in business, comes now a proposal in Congress (Senate Bill 1103 and H.R. 2945) for drastic increases in second class postal rates. If approved, it would mean an increase of as much as 400 per cent in some cases, depending on a proposed scale graduated according to the amount, or proportion, of advertising carried. In the second year of operation, a further increase of 50 per cent in the rates assessed would be applied. The purpose of the legislation is to increase postal revenues and decrease the large deficit with which Post Office operations are more or less chronically afflicted.

The effect of the legislation, if enacted, would be to drive out of circulation some publications, particularly those of scientific, professional, and educational societies which own and publish their journals. These journals are frequently subsidized, in whole or in part, by their respective associations and an added mailing cost would be a serious matter for them. Even in the case of publications which have subscription and advertising revenues, they are, in many instances, a considerable financial undertaking. Advertising support for most strictly scientific journals is small, and no advertising is carried in some. For these, even a small increase in second-class postage rates would mean a real hardship, and a big increase such as proposed would jeopardize their survival.

Speaking only of AVMA publications, the monthly JOURNAL and the quarterly *American Journal of Veterinary Research* account for about two-thirds of the total annual operating costs of the Association and for only about one-half of the income. Because of greatly increased costs during and since the war, these two journals have actually lost money for the AVMA during the past two years. This in spite of increased advertising rates for the JOURNAL in an effort to maintain balance. The Research Journal is a good example of a scientific publication which carries a minimum of advertising as a matter of policy. Yet it is one of the leading, if not the foremost, periodical in the field of veterinary science, and its support by the Association as a contribution to scientific literature is eminently justified.

Generally speaking, there is a limit to the extent to which membership dues, subscriptions, and advertising rates can be increased in fairness to all concerned and without reaching the point of diminishing returns. If second class postal revenues must be increased in order to make the Post Office Department more nearly self-supporting, it should be accomplished without penalizing publications in the professional and scientific fields which are so important to the cultural and economic development of the nation and the general welfare of our people.

The AVMA has gone on record with the Senate and House Committees on Post Office, which are holding hearings on the bills, expressing strong opposition to measures which would severely handicap many small publications such as ours. A number of state associations, particularly those which have publications, have also been apprised of the situation and action by them has been urged. Many trade and professional publications have joined in the presentations to Congress. The outcome will be of real interest and importance to the future of such journals.

The High Cost of Publishing Scientific Material

The decision of a publisher of scientific books and journals not to launch a new and much needed journal in the field of the neurological sciences (*J. Am. M. A.*, Feb. 5, 1949: 397) is charged to the high wage scales in the printing industry that bodes ill for scientific literature, such as books of limited demand, text books in medicine, science, and technology which normally can have but a small number of buyers, and last, and "the hardest hit," the group of scientific journals with their relatively small circulations.

The journals of the AVMA belong in the latter class. As the publishers of veterinary journals know too well, printers can no longer be deeply interested in the printing

of periodicals that require a large amount of meticulous composition and variety of types for short press runs, and therefore, have to charge extraordinary prices which have to be passed on to the readers. There's but to add (as a reminder) that the cost of collecting, editing, printing, illustrating, and proofreading journal material is as high as if the circulation ran into six or more figures.

As Charles C. Thomas, Springfield, Ill., the publisher referred to, said: "The situation means that in 1949 and 1950, there are several pretty solidly supported scientific journals in this country that will begin to run consistently in the red," notwithstanding that the need of them was never greater.

The Housing of Farm Animals a Backward Art

That architecture has a place in veterinary medicine is shown by the rigid engineering it enforces for the construction and the sanitary maintenance of abattoirs. But in the rôle of physician, zoötechnician, and hygienist, the housing of animals is a small part, if any, of a veterinarian's basic training. As Marcel Theret *(Rec. Méd. Vét.,* Sept. 1947) points out, livestock farmers through the centuries have kept man from advancing from his contemporary status by failing to provide definitely hygienic surroundings for domestic animals.

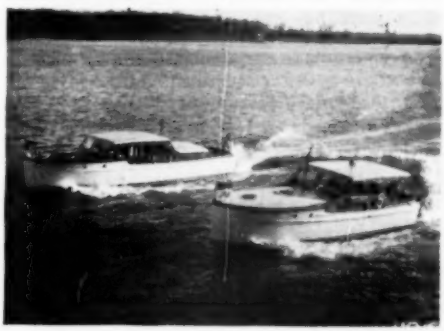
In the quest for subsistence, however, the world has come a long way from the outdoor flocks of the ancient shepherds to the animal prodigies of the present time, but there never has been a period when animals have been properly housed. The heavy milker, the precocious steer, the quick-growing hog, the 300-egg hen, and the prepotent sire, for which fine buildings are provided to insure a higher degree of economic security for the producer, are but a small fraction of total farm animals, the majority of which are unscientifically sheltered. True, the open-air, year-around flocks of long ago have been gradually provided with protection against climatic vicissitudes as civilization advanced and populations multiplied, but to say that hygienic housing has kept pace with sanitary science is far from the truth. Leastwise, little pertaining to the subject gets formal treatment in the college training. One combs in vain through scattered literature for meager directions on the housing of animals that are based primarily on the teachings of veterinary science.

We look askance at the stone, windowless, unventilated stables of the Old World and shut our eyes on the uncounted thousands of bank barns and adjacent dung piles around us. These, like the stone stables of Europe, are relics of the past which, for economic reasons, could not be refashioned with every advance of sanitary science. Buildings are permanent things, and costly. Any general practitioner will testify that the fine installations scattered over the American farmscape are "palaces in the slums" which have given a wrong impression of the whole to those, from here and abroad, who write about our palatial dairy and stock farms.

Vast and difficult as the problem is, the housing of animals is a part of veterinary medicine that ought to be solved by legal enactments as faithfully conceived as the sanitary codes for human dwellings and the regulations on the construction of packinghouses. It involves the health, the comfort, and the economic production of animals. Labor-saving orientations and interior arrangements would overcome, in part, the flight of the rural population to the industrial centers.

As the human dwelling should have the touch of sanitary medicine from eaves to sewer in the interest of public health, so should the housing for animals in the interest of the food supply. In fine, shelter for animals, regardless of many ramifications foreign to the field of medical science, is an inseparable part of veterinary medicine.

Should not the veterinary colleges provide in their curriculums at least the fundamental specifications for shelter for animals, so that veterinary students may acquire a consciousness of this important subject? If not in the regular curriculum, it might be made a requirement in the preveterinary course.



A boat scene on the majestic Detroit River, which carries the commerce of two nations—the United States and Canada.

CURRENT LITERATURE

ABSTRACTS

Panting in Cattle

Clinical and pathologic observations were made on a number of panters at Izatnagar, India. These cases apparently developed as a sequel to foot-and-mouth disease.

Symptoms were usually worse in the monsoon season than in the hot, dry season. The outstanding pathologic feature is reduction in size of the thyroid gland, with small vesicles and diminished storage of colloid. Although the essential pathogenesis of the condition is not yet clear, it is suggested that probably the thyroid is too active for the animal's needs and that the reduction in size of the gland is a compensatory adaptation.—[*F. C. Minett: Panting in Cattle—A Sequel to Foot-and-Mouth Disease. I. Experimental Observations and Pathology. Am. J. Vet. Res., 10, (Jan., 1949): 40-48.*]

Pregnancy Test in Mares

Blood serum (9 to 20 cc.) from mares pregnant thirty-six to 111 days, when injected into the lateral lymph sac of the toad (*Bufo marinus* L. and *Bufo paracnemis* Lutz), elicited the extrusion of spermatozoa. These could be detected in the urine of the toad in from seventy-five minutes to five hours. Of 39 animals tested, using both the male toad test and the rabbit-ovulation (Cole-Hart) test for comparative purposes, there was agreement in 36 cases. Of the cases not in agreement, 1 was positive on toad test but negative on rabbit test; the other was negative on toad test but positive on rabbit. Both gave positive results on both tests when checked later. The third mare has not yet been retested.—[*J. F. Tabarelli Neto: The Reaction of the Male Toad to Pregnant Mare's Serum and its Comparative Study with the Cole-Hart Test. Am. J. Vet. Res., 10, (Jan., 1949): 74-76.*]

Antibiotics Aid Virus Isolation

Exudate from 58 birds thought to have Newcastle disease [avian pneumoencephalitis] at postmortem examination were subjected to the usual procedure for isolation of virus. Of these, 36 (62%) yielded virus when treated with penicillin and streptomycin, but only 16 (27.5%) of the filtrates were positive. In 14 instances, both were positive; in 20, both were negative; in 22, the antibiotic preparations were positive but the filtrate negative; and in only 2 instances were the filtrates positive when the antibiotic preparations were negative.—[*F. R. Beaudette, J. A. Bivins, and Barbara R. Miller: A Comparison of Filtration and Antibiotic Treatment for the Recovery of Newcastle Virus from Spontaneous Cases. Am. J. Vet. Res., 10, (Jan., 1949): 92-95.*]

Rumen Fermentation

The fermentation of rumen ingesta was studied by means of a kymograph recording apparatus and a rumen plug in an animal with a permanent rumen fistula. It was learned that gas production in the incubated ingesta is most rapid during the first few hours, and that it declines steadily until it practically disappears at twenty-four hours. The atonic rumen produces much less gas than the normal.

The relation of volatile acidity to the rate of gas production was studied, because information regarding these fundamental factors is needed to determine the best method of restoring rumen activity in the atonic organ. Although this varies with the underlying cause of the atony (bloat, engorgement, infection, traumatism), correction of this primary condition has not uniformly resulted in a rapid return to normal rumen activity. Practical application of the basic findings here reported will come later.—[*E. C. Stone: Fermentation Ability of Ingesta from Normal and Atonic Bovine Rumens. Am. J. Vet. Res., 10, (Jan., 1949): 26-29.*]

Thiamin and Its Analogue

The effects of certain vitamins may be inhibited by some of the analogues, which are compounds structurally related to the naturally occurring metabolites. In this experiment, the action of thiamin was studied especially with regard to the effect upon its function by its analogue (*o*-aminobenzyl-(3)-4-methyl-5-β-hydroxyethylthiazolium chloride hydrochloride).

Although no gross changes were detected in the general appearance of the experimental rats and their tissues, the analogue did produce a slight, but definite, inhibitory effect on the growth of weanling rats. This was apparently due to interference of the analogue with the normal functioning of thiamin in some biologic system connected with carbohydrate metabolism of the rat.

The author (who is working under an AVMA

Research Fellowship) is hopeful that the results of this basic study may soon be applied to the field of everyday veterinary practice.—[*M. J. Swenson: The Effect of a Thiamin Analogue on Growth and on the Thiamin Content of Rat Tissues. Am. J. Vet. Res., 10, (Jan., 1949):* 77-84.]

Sustaining Penicillin Levels in the Udder

When 100,000 units of penicillin were injected with an especially formulated water-in-oil emulsion vehicle as a single dose, effective penicillin levels were maintained in the treated quarter for seventy-two hours. When an equal amount of penicillin was injected in water, penicillin levels were so low as to be ineffective in twenty-four hours or less. The authors conclude that effective bactericidal activity will be maintained during the period of multiplication, and that the use of this vehicle should result in more effective treatment of quarters infected with *Streptococcus agalactiae.*—[*E. J. Foley, A. W. Stults, S. W. Lee, and J. V. Byrne: Studies on Vehicles for Sustaining Penicillin Levels in the Bovine Mammary Gland. Am. J. Vet. Res., 10, (Jan., 1949): 66-70.*]

Pyelonephritis in Rabbits

Rabbits experimentally inoculated with *Corynebacterium renalis* developed kidney lesions similar to those found in pyelonephritis in the cow. Several experimental rabbits died. Prior to 1946, the laboratory experimental animals were considered to be refractory to infection with this organism, but this report indicates that rabbits may be used advantageously in the study of the pathogenic properties of *C. renalis.* It may also lead to a more prompt development of an effective program for the treatment and control of pyelonephritis, which is annually becoming a more important disease of dairy cattle.—[*E. S. Feenstra, Frank Thorp, Jr., and M. L. Gray; Pathogenicity of Corynebacterium for Rabbits. Am. J. Vet. Res., 10, (Jan., 1949): 12-25.*]

Transmission of Visceral Lymphomatosis

Visceral lymphomatosis was transmitted apparently as a separate entity distinct from other forms of avian leucosis. Inoculations with ovarian tissue resulted in death of 32 per cent of the experimental birds. Other tissue inoculations (heart, blood, spleen, kidney, and liver) ranged upward from this figure to 60 per cent deaths in the liver-inoculated group. Survival time was apparently shortened from 242 days in the spontaneously occurring cases, to an average age of 189.5 days in inoculated chickens.—[*Olive S. Davis and L. P. Doyle: Studies in Avian Leucosis. IV. Further Transmission of Visceral Lymphomatosis. Am. J. Vet. Res., 10, (Jan., 1949): 85-91.*]

Fracture of Metatarsus in a Foal

A 2-week-old foal suffered an injury which resulted in separation of the distal-lateral portion of a metatarsal from the rest of the bone. The articulation was supported by a simple cloth bandage. After twelve days of recumbency, the foal was brought to its feet. Healing was complete in forty-five days, and two years later, no defect was apparent.—[*D. H. Chapron: Fracture of the Metatarsus in a Foal. Rec. Méd. Vét., 124, (1948): 458-461.*]—H. L. FOUST.

Rabies Vaccine and Antiserum

Results obtained in experiments with hamsters revealed no advantage in vaccination after exposure to rabies. The general evidence in favor of serum treatment is conclusive, and since the danger of neuroparalytic accidents following serum treatment does not exist, a thorough field trial of serum prophylaxis is fully warranted.—*Canad. J. Pub. Health, Feb., 1949.*

Goat Fluke Treatment

Hexachloroethane-bentonite suspension (30 cc. per animal) expelled 93 per cent of the flukes in 8 goats, but only 33 per cent in 1 goat so enfeebled by advanced fascioliasis that it was unable to stand at the time of treatment.

The goats were not adversely affected by the treatment, and, when used in a flock of goats suffering from clinical fascioliasis, the treatment stopped death losses and resulted in early and marked improvement in physical condition. The fasciolicidal efficacy of the drug is reduced when pathologic changes have resulted from presence of the parasites.—[*O. W. Olsen: Fasciolicidal Efficacy of Hexachloroethane-Bentonite Suspension in Goats. Am. J. Vet. Res., 10, (Jan., 1949): 71-73.*]

The Streptococci of Mastitis

The paper discusses, briefly, the antigenic structure of streptococci and the technique used in serologic methods of differentiation. The author uses the formamide method of Fuller to prepare extracts of the streptococci, in preference to the Lancefield procedure. Extracts prepared by the latter method contain type-specific, as well as group-specific, substances, whereas formamide extracts contain only group-specific substances. There were 629 strains of streptococci isolated from a total of 3,580 milk specimens. In most cases, the specimen was a pooled sample from several quarters of the same cow. Some specimens were from individual quarters. Most of the specimens came from a single animal in a herd, so that the data do not indicate the true incidence of infection. Of the 585 strains of streptococci which could be classified serologically, 439 were identified as *Streptococcus agalactiae*

(group B) of which 179 were nonhemolytic. The animal *Streptococcus pyogenes* (group Ca) was isolated 47 times and the human pyogenes (group Ch) was found in 12 instances. *Streptococcus dysgalactiae* was identified in 64 milk specimens. Hemolytic streptococci of groups D and E were found in 6 and 2 cases respectively. These are not considered important. Group G strains were found in four milk specimens. Streptococci of group G are not thought to be of great consequence but 3 of the cows from which these were isolated were reported to have one or more firm quarters. The group N of Ernst was represented by 11 strains. (These are not the same as Lancefield's group N). *Streptococcus uberis* was found 44 times.—[*K. Hillermark: Serologic Group-Differentiation of Mastitis Streptococci. Skand. Vet.-Tidskr., 38, (May, 1948): 257-277.*] —A.G.K.

Nerves of the Equine Leg

This is a detailed description of the distribution and size of the nerves in the horse's leg. Material from 22 horses was available for dissection and histologic examination. In addition, the area supplied by nerves or their branches was studied by determining the extent of degeneration of nerves following neurectomy. The results of the study are illustrated by drawings and photomicrographs. A four-page summary in English is provided.—[*Sture A. Nilsson: Contribution to the Knowledge on the Innervation of the Horse's Foot. Skand. Vet.-Tidskr., 38, (Aug., 1948): 401-459.*]—A.G.K.

Fowl Pest in Sweden

The first known outbreaks of this disease in Sweden occurred in 1947, involving seven flocks in the southern and central portions of the country. It is believed that the disease was introduced into Sweden by frozen chickens imported from Hungary.—[*A. Isaksson, K.-E. Kull, and B. K. Nordberg: Fowl Pest in Sweden. Skand. Vet.-Tidskr., 38, (March, 1948): 154-161.*]—A.G.K.

Common Diseases of Swine in Sweden

A survey of the diseases of swine revealed that swine influenza is a common and important cause of losses. This disease is associated with chronic rhinitis, and the two diseases may be related etiologically. Salmonella infections are not common, but when they do occur, the losses are high, especially in young pigs weighing 30 to 40 kg. Swine erysipelas may be effectively controlled by vaccination. Losses among baby pigs, due mainly to a deficiency in the diet of the sow, may be prevented by feeding a balanced ration to the pregnant sow. Unsanitary conditions in the barns are also responsible for deaths among newborn pigs. The incidence of disease has decreased since the inception of a coöperative enterprise between the packing plants, veterinarians, and swine raisers. The swine raiser is informed of the diseases found in his stock which has been sent to packing plants. He is assisted in his efforts to correct conditions which lead to the occurrence of disease on his farm. Interest was created among swine raisers by certifying herds as free of swine influenza. —[*H. Sandstedt: The Common Diseases of Swine in Sweden and Methods of Control. Norsk Vet.-tidsskr., 60, (Oct., 1948): 355-370.*] —A.G.K.

Clostridium Carnis Septicemia in Mink

An outbreak of an acute disease which persisted for several months on a mink ranch was found to be due to *Clostridium carnis*. The disease was acute and the animals were usually found dead without any warning symptoms. The postmortem picture was that of an acute septicemia. The most characteristic lesion was a grayish discrete process resembling an infarct in the cortex of the kidney. Histologically this was seen to be local capillary hemorrhage with necrosis of the adjacent tissue. At the periphery of this lesion, there were many gram-positive, rod-shaped bacteria. Cultures made from the tissues and incubated aerobically showed no growth. Anaerobic cultures revealed transparent colonies which were found to consist of spore-bearing rods. These were identified as *Clostridium carnis*. A detailed description is given of this microörganism.—[*David Sompolinsky: An Enzoötic Caused by Clostridium Carnis in Mink. Skand. Vet.-Tidskr., 38, (Sept., 1948): 506-519.*]—A.G.K.

Infectious Kerato-Conjunctivitis

In cattle, this condition is caused by a microorganism similar to *Rickettsia conjunctivae*. It was found to be widespread in the southeastern part of Yugoslavia, where it appeared epizoötically, and was characterized by swelling of the eyelids, congestion of the conjunctiva, lacrimation, and, in advanced cases, by corneal lesions. Microscopically, the epithelial cells of the conjunctiva revealed solitary or pairs and larger groups of round, oval, irregular triangular, or polygonal bodies which stained blue to dark violet by Giemsa's method. A large percentage of infected, and even noninfected, cattle also revealed eye worms (*Thelazia rhodesi*) that seem to have no relation to the disease.—[*T. Bozinovic Saljinski: Infectious Kerato-Conjunctivitis. Jugoslov. Vet. Glasnik, 9, (1947): 485.*]—E.F.

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Another infectious kerato-conjunctivitis in cattle was described by J. Kutlesa. He believes *Thelazia rhodesi* to be the primary cause of the disease, and the bacterial infection of the conjunctival and corneal epithelium to be secondary.

The parasites were found in all cases where inflammatory lesions on the conjunctiva were present and also in cattle showing no ocular changes.

Thelaziae may be found before clinical symptoms appear, but become visible only upon thorough examination of the eyes. Anesthetic solutions, dropped under the third eyelid, ease the examination as well as the mechanical removal of the parasites. Irrigation and mechanical removal of the parasites soon after the start of conjunctivitis may prevent any further development of keratitis. Mild disinfectant solutions may accelerate the healing process and promote the epithelization of the damaged cornea. It was not possible to transmit the disease to healthy animals by means of the eye discharge. The appearance of keratitis is probably due to the fact that cattle rub their irritated eyes and introduce various microörganisms from the conjunctival discharges into the developed lesions.—[*J. Kutlesa: Infectious Kerato-Conjunctivitis. Jugoslov. Vet. Glasnik, 2, (1948): 79.*]—E.F.

Bovine Brucellosis Vaccination in France

A fifteen-year study of bovine brucellosis vaccination showed that use of an avirulent strain alone is without effect, but that if it is combined with injection of sterile extracts of cultures of virulent strains of *Brucella melitensis*, the rise in the concentration of antibodies is sufficiently marked to produce immunity.

On heavily infected farms in epizoötic areas, 59 heifers were vaccinated and observed during their first two pregnancies (68 normal gestation periods during this time). Only 1 case of abortion was noted. Duration of immunity is not yet known. Controls were not used in the experiment.—[*M. Lisbonne, G. Roman, and H. Quatrefages: Vaccination of Cattle Against Brucellosis by Simultaneous Inoculation of an Avirulent Strain of Brucella and a Gluco-Lipoid Antigen (title trans.). Rev. Trav. Inst. Nat. Hyg. (Paris), 1944; abstr. in Biol. Abstr., Sec. C, 22, (Dec., 1948): 2517.*]

Hematology of Diseases of Newborn Lambs

Hematologic studies are reported for 28 sheep, 16 normal controls, and 12 cases of newborn lambs affected with a variety of diseases (white muscle disease, navel infection, docking infection, staphylococcic infection, bronchopneumonia with complications, acute peritonitis, and meningitis) were studied.

The results of blood studies on normal sheep compared fairly well with those recorded by other workers. They served well as a control for the pathologic cases. The values of blood components of most of these cases deviated greatly from the controls so that they were considered to be abnormal and indicated unfavorable prognosis.

In the case of white muscle disease, the blood study showed increased values in nearly all the common elements of blood and this particular feature was suggested to be a criterion for specific diagnosis, while in other cases, a study of the same nature could only indicate the course and fate of infection, and help in making prognoses.—[*C. T. Cheng: A Hematological Study of Some Diseases of New-born Lambs. Chinese J. of Anim. Husb. and Vet. Sci., 6, (Sept., 1947): 1-19.*]—C.-S.L.

Rinderpest Vaccine

Caprinized rinderpest virus was proved to be too strong as a vaccine, but when used simultaneously with rinderpest antiserum it produced a solid immunity. Lapinized rinderpest vaccine has been successfully used for immunizing yellow cattle, buffaloes, and dairy cows. It does not induce abortion or any other defects in dairy cows, but it does cause the reduction of milk for a few days after vaccination.

Avianized vaccine conferred a solid immunity to yellow cattle, buffaloes, and dairy cows with only slight reaction after injection. It is a good vaccine, but its potency may be lost if not carefully handled, or if subjected to a high temperature.—[*Chinese Association of Animal Husbandry and Veterinary Medicine: A Study of Three Different Kinds of Rinderpest Vaccine. J. Agric. A. of China, 187, (May, 1948): 3-18.*]—C.-S.L.

Pseudotuberculosis of Goats

Autopsy of about 200 goats in Lanchow, while working on goat-adapted rinderpest virus, surprisingly, disclosed 21 cases of pseudotuberculosis. Since this is primarily a disease of sheep and rarely found in goats, and it has never been reported in China, the writer believes that his observation and experimental results are worthy of record.

Goats so affected showed no symptoms during life. On autopsy, abscesses were found in various parts of the body, but most of them had their selective localization in lymph glands, especially the mediastinal.

The causative organism, *Corynebacterium pseudotuberculosis ovis*, is highly pleomorphic, exhibiting filamentous, bacillary, and coccoid forms. The organism is gram-positive but decolorizes easily by alcohol. Both gram-positive and negative individuals are frequently seen on the same slide.

The growth on blood agar or Loeffler's serum medium is characteristic. The fully developed colonies are large, grayish yellow, dull, and dry, with raised papilliform centers and concentric rings. They do not firmly adhere on the surface of the medium, and when touched with a platinum loop, they move easily and break up. The growth on plain medium containing no blood or serum is very scanty.

The organism can produce Strauss reaction in male guinea pigs by intraperitoneal injection. When massive doses of the organism are injected intravenously in the goats, hemoglobinuria and icterus may be produced; subcutaneous injection usually results in abscess formation.—[*S. C. Su: Pseudo-tuberculosis of Goats and its Causative Organism. J. of Anim. Husb. and Vet. Med., 6, (July, 1947): 1-5.*]—C.-S.L.

Glanders in Czechoslovakia

Scattered cases of glanders (malleus) occurred in Czechoslovakia during 1921 and 1934, but no cases were reported between 1935 and 1943. In 1944, a single case was reported—in a horse belonging to the German army.

At the close of 1945, a mallein test was ordered for all solipeds. This test and retests in 1947 revealed 109 cases, some showing no symptoms, in 62 yards of 41 villages in 28 districts. Under this system of testing all solipeds, and retesting when reactors were found, the disease was eradicated. No cases were reported in the first six months of 1948, although numerous cases were present in the neighboring states.

The ophthalmic mallein test was more dependable than complement fixation, but a combination of the two tests was most effective. No human cases were reported after World War II, in contrast with the many cases which followed World War I, and which were usually fatal.—[*F. Niznansky and A. Jelenikova: Malleus (Glanders) in Slovakia During 1921 to 1947. Casop. Ceskoslov. Vet., 3, (Oct., 1948) No. 20.*]—V.Sk.

Retained Placenta

The author recommends the use of polyvalent serum [or bacterin] as a means of preventing the secondary infections responsible for the inflammation of the uterine and cotyledonary tissues which cause retention of the bovine placenta.—[*Zygmunt Moszczenski: Treatment of Retention of the Afterbirth. Medycyna Weterynaryjna, 4 (1948): 485-489.*]—L. I. H.

Canine Skin Diseases

Effective treatment of eczema and mange in dogs often involves more than the external application of ointments or other medicaments. Constitutional factors underlying eczema and mange may be corrected by administering nonspecific protein, vitamins, minerals, and hormones, and by heliotherapy.—[*Matylda Szczudlowska: Some Skin Diseases in Dogs. Medycyna Weterynaryjna, 4, (1948): 541-545.*]—L. I. H.

Intra-arterial Medication

The amount of penicillin required for treatment of the body extremities may often be reduced by intra-arterial injection of the antibiotic agent and hemostasis to control circulation so that impregnation of the treated area can be achieved and maintained.—[*M. Szabuniewicz and A. Zielinski: Intravenous and Arterial Medication. Medycyna Weterynaryjna, 4, (1948): 545-551.*]—L. I. H.

BOOKS AND REPORTS

The Achievement of BCG Vaccination

This book gives an account of 18,000 BCG vaccinations during fourteen years (1932-1946) by the Oslo Public Health Service. It confirms the harmlessness of BCG and recommends its extensive employment. In his studies, the author was able to differentiate between the mild tuberculin reactions of vaccinated persons and the virulent tuberculin reaction of superimposed infections. Measurement in millimeters distinguished the one from the other.—[*The Achievements of BCG Vaccination. By Dr. Gerhard Hertzberg. English translation by Johan Grundt-Tanum. 224 pages. Oslo Public Health Service. 1949. Price 15 kroner.*]

Annual Report of the Chief, U. S. Bureau of Animal Industry

A continuing shortage of veterinarians for bureau work is stressed in Chief Simms' report for the fiscal year ended June 30, 1948. The full-time staff comprised 6,539 employees, aided by 375 part-time workers and 191 collaborators who served without compensation. On the full-time roster were 1,923 "professional and scientific personnel." Coöperative foot-and-mouth disease control work in Mexico and patrol of the United States side of the Mexican border were mentioned as principal new activities that required large numbers of additional personnel.

An idea of the diversity and scope of Bureau operations can be gained from leafing through this 104-page document, which lists and describes nearly 150 research projects and activities launched, completed, continued, or aided by it. From descriptions of national programs aimed at preventing and curbing dangerous animal diseases, of the Bureau's packing plant operations that safeguard public health, and of the help given on a multitude of production problems that confront stockmen, poultrymen, and fur farmers—one can only conclude that this federal bureau is giving the American people a welcome example of efficiency in tax-dollar utilization.—[*B. T. Simms: Report of the Chief of the Bureau of Animal Industry, Agricultural Research Administration, U. S. Dept. of Agriculture, for fiscal year ended June 30, 1948. U. S. Government Printing Office, Washington 25, D. C. 104 pages, paper. Price 20 cents.*]

THE NEWS

Detroit Meeting—July 11-14, 1949

Headquarters Hotels—The Statler and the Book-Cadillac

Detroit Conventions Have Been Milestones in AVMA Affairs

At the Russell House in Detroit, in August of 1900, the AVMA closed its books on the events of the 19th century and opened its 20th century chapter—a chapter that was to record some of the most significant advancements in veterinary history.

The 1900 meeting marked the Association's first visit to the place now famous as the Motor City. The convention group was small—283 members, ladies, and visitors—but its deliberations and plans set the stage for important things to come. It was here, for example, that AVMA leaders mapped their strategy for obtaining a permanent Veterinary Corps in the Army, with commissioned rank for Corps members. Army veterinarians were then on duty only in a civilian status, without the privileges and recognition accorded commissioned officers. The 1900 effort to improve the position of military veterinarians was defeated in Congress, but that defeat was not permanent. By the time the Association next met in Detroit, in 1916, enough support had been mustered, under the leadership of the late Dr. W. Horace Hoskins, to win passage of a bill that gave commissioned rank to its members, effective July 1, 1916.

Concurrently, the AVMA was working to improve the standing of veterinarians in all other branches of the service, including the U.S. BAI and the ranks of private practitioners. Higher and higher educational standards, systematic and successful appeals for better salaries for federal veterinarians, and planned activities for raising the social and interprofessional status of the private practitioner were all parts of the program that attracted 4,500 to membership by the time of the third meeting in Detroit, in the boom-and-crash year of 1929.

Now, twenty years later, the Association is returning to Detroit, with a membership that is more than double the 1929 figure, and with national influence and a record of accomplishment that surpasses even the greatest hopes of its early organizers. However, self-satisfaction and reflection on past achievements are not on the agenda of the 1949 meeting. Much remains to be done if the profession is to attain its rightful place in scientific and national affairs. This explains why the Board of Governors, Executive Board, and House of Representatives will be in session from one to four days before the official opening of the convention, to act on important problems confronting the profession. Their decisions, and the effects of their decisions, may well be a new milestone in the eighty-six years of AVMA progress.

Complete information about the Detroit meeting will appear in the June JOURNAL, which will be the Convention Number. Included will be a schedule of the literary programs, entertainment features, a roster of affiliated groups which will meet in Detroit dur-

The Ford Museum, depicting American history, with the famous Greenfield Village to the right.

ing the convention week, and a description of the technical (commercial) exhibits by nearly 40 companies.

Members are urged to make hotel reservations without delay. Detroit hotels have made a generous allotment of rooms and suites and there will be ample accommodations for the record-breaking attendance expected, but unless reservations are made not later than June 10, choice rooms may be difficult to get. The form appearing on page 43 in the advertising section of this issue should be used in making reservations.

Program Progress for the Detroit Annual Meeting

A paper will be presented at the eighty-sixth annual meeting of the AVMA at Detroit, July 11-14, 1949, by W. Palmer Dearing, M.D., Deputy Surgeon General. He will discuss the future health needs of the nation. A. H. Quin, D.V.M., Kansas City, Mo., will present a résumé of the advancements in veterinary therapy, and W. T. Oglesby, D.V.M., Baton Rouge, La., will review some specific instances of disease outbreaks which resulted from inaccurate lay diagnosis and careless administration of biological products merchandised over the counter.

The complete program will appear in the June JOURNAL.

Plan Eventful Program for Women at Detroit Meeting

The fact that women have been attending AVMA conventions in greater numbers each year attests to the excellent work in program planning that has been done by the women serving on the local arrangements committees and by the Women's Auxiliary. This year, the local planning is headed by Mrs. R. A. Runnells, of East Lansing. Others serving in an executive capacity on the local Women's Activities Committee are Mrs. D. L. Caswell, of Royal Oak, and Mrs. S. R. Elko, of Highland Park, *co-vice-chairmen;* and Mrs. F. D. Egan, of Farmington, *secretary.*

Registration will begin at noon on Sunday, July 10, and the technical exhibits will open on Monday morning. Following the opening general session on Monday afternoon, to which all of the women are invited, there will be a women's tea and a young people's mixer, both at 4:30. On Tuesday morning, the ladies will tour, by chartered busses, historic Greenfield Village, about 30 miles outside of Detroit, after which they will be entertained at a luncheon in the famous Dearborn Inn on the Village grounds. Wednesday will open with a women's brunch in the Grand Ballroom of the Book-Cadillac Hotel, followed by the annual meeting of the Auxiliary. In the evening, the alumni dinners will be held as separate group events in various dining rooms of the Statler and Book-Cadillac, and women will be invited to join the men in nearly all of these groups. Immediately after the dinners, the entire convention gathering will be welcomed at the President's Reception and Dance in the Grand Ballroom of the Statler. Thursday morning, July 14, is set aside for "do as you please," such as shopping and sightseeing, and the convention will close at noon of that day.

The women's program is so arranged that there will be ample free time for touring the downtown shopping district and some of Detroit's places of outstanding interest, including automobile manufacturing plants and Belle Isle. Windsor, Ont., just across the river from Detroit, offers another excellent opportunity for sightseeing. Those who bring children to the meeting will find Belle Isle an ideal spot for entertaining them. It is a thousand-acre park in the middle of the Detroit River and has sports fields, bathing beaches, a zoo designed especially for children, and a 2-mile miniature railway.

Travels of President Hurt

As an example of what is expected of its principal officer, the winter itinerary of President L. M. Hurt, completed a few weeks ago, shows how much time is devoted, especially at certain seasons of the year, to meeting the numerous requests from all over the country to appear on programs of constituent associations and conferences. The job of AVMA president carries great honor and responsibility, plus plenty of work and travel, particularly if he undertakes to accept the many calls on his time, as the presidents of recent years have done.

Because of the concentration of so many meetings and conferences in the month of January, the winter schedule has become almost an endurance contest. For example, President Hurt left Los Angeles on Dec. 29, 1948, and did not "touch home plate" again for nearly six weeks. In that time, he attended the following:

Jan.
4–5—Pennsylvania Veterinary Conference, Phildelphia.
5–7—Ohio State Veterinary Medical Association, Columbus.
8–9—(En Route.)
10–11—Oklahoma State Veterinary Medical Association, Oklahoma City.
12—(En Route.)
13–15—Indiana State Veterinary Medical Association, Indianapolis.
16—(En Route.)
18–20—Iowa State Veterinary Medical Association, Des Moines.
22–23—Board of Governors, Chicago.
24–25—AVMA office, Chicago.
26–28—Illinois State Veterinary Medical Association, Springfield.
29-30—(En Route.)
Feb.
3–4—Veterinary Medical Association of New Jersey, Trenton.
5–8—(En Route.)
8—Arrived Los Angeles.

At each of these meetings, Dr. Hurt gave a talk on AVMA affairs and, in some cases, also contributed to the scientific program. Because of conflicting dates, he was unable to attend

the veterinary conference at Cornell University, Jan. 5-7, and the annual meetings of the Kansas Veterinary Medical Association in Wichita, Feb. 2-4, to both of which he was invited. He was also invited to the Virginia State Veterinary Medical Association meeting in Roanoke, March 3-5, but was unable to accept because of his work schedule as director of the Los Angeles County Livestock Department.

President Hurt's spring and summer schedule, at this writing, includes the AAHA meeting in Chicago, May 5-7; Board of Governors, Chicago, May 8; the veterinary conference at Washington State College, Pullman, June 15-17; Northwest Veterinary Medical Association, Victoria, B. C., June 28-30, and, finally, the AVMA convention in Detroit, July 11-14. He was also invited to attend the New York State Veterinary Medical Society meeting in New York City, June 23-25, and the veterinary conference, University of Wisconsin, Madison, June 21-23, but could not because of previous commitments.

Upon returning home from his winter trek, President Hurt addressed a letter to the secretaries of the associations, expressing his pleasure in attending the various meetings and adding this thought:

> Such meetings are valuable in many ways, and I always come away from them feeling that I have absorbed much more than I could possibly contribute. You and your committees deserve great credit for painstaking efforts which were apparent in every part of your meeting. The contributions were good ones, and those veterinarians who could not attend were indeed unfortunate.

Recommends Participation in Professional Activities

Dr. W. G. Brock, Executive Board member from District VIII, in concluding his address to the Louisiana VMA meeting recently, recommended to his listeners that they (1) take a vital interest in their professional organizations, (2) assist and coöperate with the other veterinarians in their community, (3) broaden their education and knowledge by attending

Detroit's City Hall surrounded by stately skyscrapers.

veterinary medical association meetings and dairy, agriculture, and soil conservation meetings in their community, and (4) develop a hobby which will be of benefit in later life such as surgery, medicine, or real estate. "Don't criticise your colleagues or the public but work with them and you will be a success," was his concluding advice.

1949 Directory Publication Plans

A new system of setting up and maintaining directory listings has been developed which will greatly simplify, improve, and facilitate the production of future editions of the AVMA *Directory*.

The new system will be used in the preparation of the 1949 *Directory*, since the installation and use of it will not delay the issuance date by more than a month or two. Consequently, the 1949 edition is being planned for printing early this fall. In the meantime, work which has been under way for some time in completing the listing data for all veterinarians in the United States and Canada is being continued.

According to custom, the AVMA *Directory* has been published only in the odd years, as it has not been feasible to issue one more often. The new system will make possible a new edition every year, if desired. The present (1947) *Directory* came out in August of that year, and is still useful in spite of changes that have occurred since it was printed. A limited number of copies is still available and will be sold at half price ($1.00), postpaid, to members and student chapter members as long as they last. Orders with remittance may be addressed to the AVMA Directory Department, Room 812, 600 S. Michigan Ave., Chicago 5, Ill.

Dictionary Publishers Consider Revision of Veterinary Terms

As briefly announced in the "AVMA Report" (p. 18), a detailed letter has been sent by the Association to publishers of leading dictionaries, urging that they give consideration to revising definitions of "veterinarian, veterinary, and veterinary surgeon" so that such definitions will properly reflect the present high standing of the profession and the modern concept of its work.

A common fault in popularly used dictionaries, pointed out in the AVMA letter, is failure to identify the veterinarian as a "Doctor of Veterinary Medicine" and a "member of the veterinary medical profession"—an identification that would connote the high professional status of the recognized North American veterinary college graduate. In the case of "veterinary," the appeal was that it be labeled as colloquial when used as a noun. The identification of "veterinary surgeon" as primarily a British term also was recommended.

An early reply to this letter came from the G. & C. Merriam Company, Springfield, Mass., publishers of "Webster's New International Dictionary," as follows:

We thank you for your letter of April 5 concerning the views of the American veterinary profession on the definitions of "veterinarian, veterinary, and veterinary surgeon." You may be assured that due weight will be given to this information when these terms are reviewed for any future edition of "Webster's New International Dictionary."

Perhaps we should point out, however, that no dictionary successfully creates language. We conceive it our function to appraise and report language as it is actually used both by relevant professional groups and by the general public. Our selection of entries and our definitions of the terms selected are in all cases based on cross-sections of actual usage in pertinent writings. Consequently, we are satisfied that it is use by public and press that has put "veterinary" in the dictionary as a noun rather than that its presence in the dictionary has induced its use.

AVMA Research Fellows

R. F. Borgman was born March 14, 1926. He was educated at Michigan State College (D.V.M. 1947) and practiced for one year with Dr. W. R. West, Norfolk, Va. In September, 1948, he returned to Michigan State College to begin work under his AVMA fellowship.

PLAN OF THE PROJECT

Dr. Borgman is interested in learning more fully the functions of the thyroid gland in the dog. Although thyroid therapy is widely used in small animal practice, much of it is on a symptomatic or an empiric basis, because the fundamental knowledge of thyroid function is not available.

One phase of the work will be to study the effects of varying levels of thyroprotein feeding on intact and on thyroidectomized dogs. Observations will be made on metabolic rate,

Dr. Robert F. Borgman

body weight, body temperature, pulse, and general condition. After establishing thyroprotein levels for therapeutic dosage and for tolerance, and then conducting comparable tests on the same dogs with dessicated thyroid, an assay method may be computed.

Another phase will be to study the effect of thyroid stimulation on rate of growth when thyroprotein is fed continuously from puppyhood to maturity. Observations will be made on litter size, puppy vigor, fertility, and senility.

It is hoped that the study will provide a rational basis for thyroid therapy in dogs.

Women's Veterinary Association

The following letter was received by Dr. Mary Dunlap from Dr. Marion Freak, 15 Park Ave., Potters Bar, Middlesex, England:

> As we are hoping to meet many of you over here for the International Veterinary Congress next August, I am writing to say what very real pleasure it would give us if you and your colleagues would care to stay as guests in our homes while the congress is on and, so far as members in our provinces are concerned, stay on for a while and visit further afield than London. . . .

To date, only Dr. Edith Williams, Toronto, Canada, has declared her intention of attending the Congress. If others plan to attend, they sholuld write directly to Dr. Freak.

Officers of the Women's Veterinary Association are Drs. Patricia O'Connor, Staten Island, N. Y., *president;* Josephine Deubler, Philadelphia, Pa., *vice-president* of the eastern section; June Platt, East Lansing, Mich., *vice-president* of the midwestern section; Hope Campbell, Dallas, Texas, *vice-president* of the southern section; Lorraine Beaman, Long Island City, N. Y., *secretary;* and Lois Calhoun, East Lansing, Mich., *treasurer.*

s/L. C. BEAMAN, *Secretary.*

W. Reid Blair, D.V.Sc. 1875-1949

On March 1, 1949, death ended the career of Dr. W. Reid Blair (Mc G '02), 74, director emeritus of the New York Zoölogical Park in the Bronx. Internationally known as an authority on zoölogy and comparative medicine, Dr. Blair was also distinguished as a park executive and wildlife conservationist.

Before graduating from McGill University in 1902, Dr. Blair had accepted the position of veterinarian in the New York Zoölogical Park. During his forty-six years at the Park, he was responsible for the development of advanced scientific methods in the medical and surgical treatment of wild animals in captivity and also for the planning and erection of the first fully equipped animal hospital in any zoölogical garden. From 1905 to 1917, he was professor of comparative pathology in the Veterinary Department of New York University.

In the field of conservation, Dr. Blair was credited with having saved the European bison (wisent) from extinction. On a trip to Europe in 1931, Dr. Blair discovered that only 31 of these animals remained alive, and not until a sanctuary had been established for their preservation did he leave the Continent. He traveled to the Belgian Congo in 1937 to bring back some of the first okapis and Komodo monitors or giant lizards.

Among his many publications, his best known book is "Diseases of Wild Animals in Confinement" which has become the zoo keeper's handbook. He also is the author of the more popular book "In the Zoo."

Enlisting in the U.S. Army in 1917, he was commissioned in the Veterinary Corps, and when on May 31, 1919, he was honorably discharged with the rank of major, he returned to duty in the Zoölogical Park. Following the retirement of Dr. W. T. Hornaday in June, 1926, Dr. Blair became director of the Park.

For ten years, he served as secretary of the Conservation Committee of the New York

Dr. W. Reid Blair

Zoölogical Society and as Executive Secretary of the American Committee for International Wildlife Protection from 1938 to 1947, when he resigned both posts.

Dr. Blair is survived by his wife, Mrs. Mildred Blair, *née* Kelly; a brother, Bruce Blair, D.V.M., New York; and a sister, Mrs. Clayton Hudson, Worcester, Mass.

Are You Moving?

Notify the AVMA office of change of address before the 15th of the month; otherwise your succeeding Journal will not be delivered. The Journal is not forwardable under the mailing regulations.

Executive Board Nominees in Districts IV and X

The polls for nomination of candidates for five-year terms on the Executive Board from District IV (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, West Virginia, Cuba, Puerto Rico, South America, and the West Indies) and District X (Michigan and Ohio) closed on Apr. 15, 1949. Drs. R. L. Trader and W. A. Young, Chicago, served as tellers on April 18 and certified the following nominees:

District IV

Dr. A. S. Barnes, Frankfort, Ky.
Dr. B. E. Carlisle, Camilla, Ga.
Dr. W. M. Coffee, LaCenter, Ky.
Dr. Taylor P. Rowe, Richmond, Va.
Dr. R. S. Sugg, Auburn, Ala.

District X

Dr. C. S. Bryan, East Lansing, Mich.
Dr. C. F. Clark, East Lansing, Mich.
Dr. F. D. Egan, Farmington, Mich.
Dr. B. J. Killham, East Lansing, Mich.
Dr. W. R. Krill, Columbus, Ohio.

Ballots listing the nominees were mailed to members in the two districts on April 22. The election polls will close on June 22, 1949, and the successful candidates will take office at the conclusion of the annual meeting in Detroit, July 11-14, 1949.

STUDENT CHAPTER ACTIVITIES

Iowa Chapter.—Officers of the Iowa State College Student Chapter of the AVMA are: John Siemens, *vice-president;* Keith Giese, *president-elect;* Otto Van Roekel, *secretary;* William Preston, *critic;* Leland Bunge, *treasurer.* Class representatives are: Warren Kilpatrick (senior); William Tyler (junior); George School (sophomore); and Edward Cunningham (freshman).

Feeling that in the past the ISC veterinary students have been too isolated, they are now attempting to broaden their friendships. Through the Agricultural Council, the students in agriculture have been invited to attend the veterinary programs to hear speakers in whom they are interested. The local ministerial association was invited to hear Dr. Millen, a veterinary missionary to India, and the Story County dentists and medical doctors have been invited to hear speakers on subjects where human and veterinary medicine are closely related.

The Honor System at Work.—The Executive Council of the chapter, having heard testimony regarding an infraction of the Honor Code, after the case had been heard in the individual's own class, found the defendant guilty of both seeking and offering information during an examination. It therefore recommended: (1) that the defendant's grade in the examination during which the infraction occurred be reduced to zero; (2) that official notice be given in writing over the dean's signature placing the defendant on conduct probation to the Veterinary Division so long as he is so enrolled; (3) that proper administrative steps be taken to place the defendant on conduct probation to ISC so long as he is so enrolled.

After review, both the dean and the college Government Committee commended the Chapter in its handling of the case and concurred in all recommendations. It is believed that the man, the Chapter, and the profession will be better for having fairly and impartially worked this through together.

S/ROLAND C. BUNGE, *Retiring Secretary.*

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Ontario Chapter.—At the October, 1948, meeting of the Student Chapter of the Ontario Veterinary Association and the AVMA, Mr. John Taylor, representative of the International Student Service, spoke of the Seminar in Germany.

Dr. W. A. Taylor spoke on "The Ethics of Veterinary Practice" at the November meeting. In December, Dr. W. G. Burton of Homewood Sanatorium, Guelph, spoke on "Diseases Confronting the Psychiatrist." At the January meeting, members of the Chapter heard Dr. A. E. Cameron, retired veterinary director general, speak on the problems that young graduates face in general practice. Dr. W. E. Shute discussed "Vitamin E" at the February meeting, and, in March, Dr. C. P. Zepp, Jr., New York City, spoke on "Some Aspects of Small Animal Practice."

The average attendance of these meetings was approximately 250 students.

Officers of the Chapter are Goeffry Lord, *president;* Jerry Hergott, *vice-president;* Gordon Armour, *secretary;* David Gaunt, *treasurer;* Tom Sewall, *sophomore representative;* and T. R. Wright, *freshman representative.*

S/GORDON ARMOUR, *Secretary.*

WOMEN'S AUXILIARY

Alabama Auxiliary.—The Women's Auxiliary to the Alabama Veterinary Medical Association was organized, with the help of Mrs. A. E. Bott, at the Decatur meeting on Feb. 24-25, 1949. Officers of the new organization are Mrs. Ray Ashwander, Decatur, *president;* Mrs. C. H. Poitevint, Dothan, *vice-president;* and Mrs. Carl Jones, Athens, *secretary-treasurer.*

S/MRS. CARL JONES, *Secretary.*

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Arkansas Auxiliary.—The Women's Auxiliary to the Arkansas Veterinary Medical Association, organized at the annual meeting of the Association in Little Rock on Feb. 17-18, 1949, elected Mrs. Rease Mitchum, Little Rock, *president;* Mrs. W. C. Brooks, Prairie Grove, *vice-president;* and Mrs. T. D. Hendrickson, Little Rock, *secretary-treasurer.* The new Association voted to meet jointly with the Mississippi and Tennessee Auxiliary associations in Memphis, Tenn., in January, 1950.

S/MRS. T. D. HENDRICKSON, *Secretary.*

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New Jersey Auxiliary.—At the annual meeting of the New Jersey Veterinary Medical Association in Trenton on Feb. 3-4, 1949, the

Women's Auxiliary outlined plans to affiliate with the national program. Mrs. J. H. Spurlock, Allentown, was elected *president*; Mrs. R. A. Hendershott, Trenton, *vice-president*; Mrs. John McGrann, Trenton, *second vice-president*; Mrs. James Savage, Allamuchy, *secretary*; and Mrs. Lewis G. Hamilton, Belvedere, *treasurer*.

s/MRS. JAMES SAVAGE, *Secretary*.

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Mrs. White to Preside over House of Representatives.—One of the ambitions of the Women's Auxiliary to the AVMA is to become federated, bringing together each state organization into a House of Representatives of the Auxiliary. The third annual meeting of

Mrs. Floyd H. White

the House will be a part of the Auxiliary program during the Detroit session of the AVMA. At this time, the roll will be called and each state, provincial, and regional group will exchange ideas, plans, and policies helpful to all. A chairman and secretary will be elected from the House of Representatives to direct the work for the coming year. Mrs. Floyd H. White, San Rafael, Calif., who has previously served her state as president of the Women's Auxiliary, will be the presiding officer at the Detroit meeting of the Auxiliary House of Representatives.

s/(MRS. A. E.) ETHLYN BOTT, *President*.

APPLICATIONS

The listing of applicants conforms to the requirements of the administrative by-laws—Article X, Section 2.

First Listing

BARTOL, FRANK H.
616 W. 5th St., Willmar, Minn.
D.V.M., Michigan State College, 1940.
Vouchers: G. C. Nugent and T. O. Eliason.

BROCK, GUNTHER A.
110 Exposition Ave., Dallas, Texas.
D.V.M., Texas A. & M. College, 1941.
Vouchers: W. G. Brock and L. G. Cloud.

BUCKWALTER, ROBERT C.
6810 Carlisle St., Philadelphia 26, Pa.
V.M.D., University of Pennsylvania, 1947.
Vouchers: R. H. Hollis and D. C. Kelley.

COLANDO, ANDREW C.
Point-A-View Farm, Yardley, Pa.
V.M.D., University of Pennsylvania, 1948.
Vouchers: E. A. Churchill and J. D. Beck.

ERKEL, RALPH L.
1626 9th Ave. S., St. Cloud, Minn.
D.V.M., Michigan State College, 1945.
Vouchers: J. N. Karcher and C. H. Wetter.

GENEST, PAUL
Laboratoire de Recherches Vétérinaires, St. Hyacinthe, P.Q., Canada.
M.D.V., University of Montreal, 1936.
Vouchers: J. Dufresne and J. D. Nadeau.

MCINTOSH, ARTHUR J.
721 Locust St., La Porte City, Iowa.
D.V.M., Iowa State College, 1944.
Vouchers: D. M. Walker and R. M. Hofferd.

MULLINS, ORIN E.
1251 Thompson Ave., Glendale 1, Calif.
D.V.M., Texas A. & M. College, 1939.
Vouchers: C. H. Clark and M. R. Arteaga.

SABBAN, MOHAMMED S.
12 Sirry Pasha St., Mounira, Cairo, Egypt.
D.V.M., Cairo University, 1940.
Vouchers: W. M. Hagan and J. G. Hardenbergh.

STOCKING, REGINALD A.
3166 Los Feliz Blvd., Los Angeles 26, Calif.
D.V.M., Texas A. & M. College, 1943.
Vouchers: S. M. Sjarring and A. J. Sargent.

THOMPSON, DAVID C.
Virden, Manitoba, Canada.
B.V.Sc., Ontario Veterinary College, 1942.
Vouchers: A. Savage and J. M. Isa.

Second Listing

Batson, Neal C., Veterinary Hospital, Sumter, S. Car.

Carter, Gordon R., Dept. of Vet. Hyg., I.S.C., Ames, Iowa.

Garling, John W., 3165 Sylvania, Toledo 12, Ohio.

Hammer, Walter D., 784 El Portal Pk., San Pablo, Calif.

Mittelsted, Gale W., 212 Pine St., Chaska, Minn.

Pegg, Charles E., Jr., Kanagawa Military Government Team, APO 503, c/o Postmaster, San Francisco, Calif.

Rickards, David A., 212 Walnut St., Aurora, Ill.

Russell, Ben L., 909 Pile St., Clovis, N. M.

Shepard, Shirley, Box 214, Moultrie, Ga.

Villamil, Juan A., Ciudad Universitaria, Bogota, Colombia.

Wempe, Lillis R., Station Veterinarian, Shaw Field, Sumter, S. Car.

U. S. GOVERNMENT

Examination for Sanitarians.—A competitive examination for appointment of sanitarians (milk and food specialist) and sanitarians (bacteriologist) in the regular corps of the U.S. Public Health Service will be held on June 8-10, 1949. Applications must be received by May 18, 1949.

The regular corps is a commissioned-officer corps composed of members of the various medical and scientific professions, appointed in appropriate professional categories, such as

medical, dental, nursing, engineering, bacteriology, etc.

Appointments will be made in the grades of assistant sanitarian (1st lieut.) and senior assistant sanitarian (captain). Appointments are permanent and provide opportunities to qualified sanitarians for a lifetime career in public health.

Entrance pay for an assistant sanitarian with dependents is $3,811 per annum; for senior assistant with dependents, $4,489. These figures include subsistence and rental allowance. Promotions are made at regular intervals.

Application forms and additional information may be obtained by writing to The Surgeon General, U.S. Public Health Service, Washington 25, D.C. Attention: Division of Commissioned Officers.

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Veterinary Personnel Changes.—The following changes in the force of veterinarians in the U. S. Bureau of Animal Industry are reported as of March 24, 1949, by Chief B. T. Simms.

TRANSFERS

D. Warner Anderson, from Orangeburg, S. Car., to New York, N. Y.

Grant E. Blake, from Salt Lake City, Utah, to Beltsville, Md.

Rush M. Johnson, from Charleston, W. Va., to Madison, Wis.

Ernest E. Saulmon, from El Paso, Texas, to San Antonio, Texas.

Walter A. Schuehle, from Seattle, Wash., to Mexico City, Mexico.

Francis L. Thomas, from Atlanta, Ga., to Sioux City, Iowa.

Wilbur H. Wiswell, from Newport, Vt., to New York, N. Y.

SEPARATIONS

Ralph L. Canis, Omaha, Neb.
Herman Elgart, Philadelphia, Pa.
Arden A. Erdmann, Madison, Wis.
William C. Hines, Los Angeles, Calif.
Kenneth L. Kuttler, Beltsville, Md.
Buell S. Law, Oklahoma City, Okla.
Eugene L. Orput, St. Paul, Minn.

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Dr. Kurtpinar Studies Parasitology in the U. S.—Dr. Hasib Kurtpinar, D.V.M., chief, Section of Veterinary Parasitology, Department of Veterinary Service, Ministry of Agriculture, Ankara, Turkey, who was sent in October, 1946, by the Turkish Government to make an extended study of recent developments in parasitology in the United States, currently is a guest in the laboratories of the Zoölogical Division, Bureau of Animal Industry, Agricultural Research Center, Beltsville, Md. Since his arrival in the United States, his time has been spent mainly with Dr. M. A. Stewart, Division of Entomology and Parasitology, University of California, Berkeley, Calif., and with Dr. D. E. Howell, Oklahoma A. and M. College, Stillwater, Okla. He has also visited the Georgia Agricultural Experiment Station, Griffin, Ga., the Washington State Veterinary College, Pullman, Wash., and the following laboratories of the Public Health Service: Rocky Mountain Laboratory, Hamilton, Mont., Q Fever Laboratory, Los Angeles, Calif., and the Encephalomyelitis Laboratory, Bakersfield, Calif. Before returning to Turkey in September, Dr. Kurtpinar plans to visit the Zoological Division's Station at Albuquerque, N. M., the Bureau of Entomology and Plant Quarantine's Station at Kerrville, Texas, and the College of Veterinary Medicine at Fort Collins, Colo.

AMONG THE STATES AND PROVINCES

Alabama

State Association.—The Alabama State Veterinary Medical Association met in the Hotel Lyons in Decatur on Feb. 24-25, 1949. After the address of President H. L. Farr, the scientific program was presented.

Drs. W. J. Gibbons, Auburn; A. H. Groth, Auburn; H. L. Allen, Demopolis; R. A. Ashwander, Decatur; L. E. Beckham, Tuscaloosa; G. C. Hardwick, Huntsville; and J. M. Davis, Albertville, were members of a symposium on "Breeding Problems in Cattle."

Speakers on a symposium on "Newcastle Disease of Poultry" were Drs. C. S. Roberts, Auburn; E. H. Walker, Auburn; D. B. Croft, Crossville; and J. C. Johnson, Mt. Hope.

Drs. R. S. Sugg, dean, School of Veterinary Medicine, Auburn, and B. N. Lauderdale, veterinarian in charge, U.S. BAI, Alabama, discussed "Brucellosis and Calfhood Vaccination." "Parenteral Alimentation" was discussed by Drs. J. E. Greene, N. C. Crandall, and B. F. Hoerlein, all of Auburn.

At the business session, Dr. Ray Ashwander, Decatur, was elected *president;* Dr. C. H. Poitevint, Dothan, *vice-president;* and Dr. I. S. McAdory, Auburn, *secretary-treasurer.* Dr. B. N. Lauderdale is the new member of the *Executive Board* and Drs. I. S. McAdory and C. H. Poitevint were elected *delegate* to the AVMA and *alternate,* respectively.

s/I. S. MCADORY, *Secretary.*

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Animal Disease Research Workers.—The third annual meeting of the Animal Disease Research Workers in the Southern States was held in Duncan Hall, Alabama Polytechnic Institute, Auburn, on April 7-8, 1949. The scientific program follows:

DR. DENNIS SIKES, Knoxville, Tenn.: "Chronic Fluorosis in Domestic Animals."

DR. M. F. HANSEN, Lexington, Ky.: "Preliminary Investigations on Effects of *Monezia expansa* on Sheep."

DR. BENJAMIN SCHWARTZ (Ph.D.), Washington, D. C.: "The Control of External Parasites of Sheep with Benzene Hexachloride."

DR. D. E. HOWELL (Ph.D.), Stillwater, Okla.: "The Quantities of Chlorinated Hydrocarbons Appearing in the Tissues and Milk of Animals following Spraying."

DR. R. L. MAYHEW, Baton Rouge, La.: "Studies on Hookworms of Cattle."

DR. E. P. JOHNSON, Blacksburg, Va.: "Histologic Studies of Local Johnin Reactions in Cattle."

MR. W. D. SALMON, Auburn, Ala.: "The Production of Tumors in Experimental Animals as a Result of Choline Deficiency."

DR. H. SCHMIDT, College Station, Texas: "The Rôle of Vitamin A in the Formation of Urinary Calculi in Sheep."

DR. D. E. COOPERRIDER, Knoxville, Tenn.: "The Treatment of Parasites of Poultry."

DR. E. R. DOLL, Lexington, Ky.: "The Immunogenic Response to Low Virulence Newcastle Disease Vaccine."

MR. F. M. MANLEY, Auburn, Ala.: "Newcastle Disease in Northwest Alabama and Results of a Vaccination Program."

DR. S. B. HITCHNER, Blacksburg, Va.: "Low Virulent Newcastle Virus Vaccines."

DR. G. J. COTTIER, Auburn, Ala.: "The Effect of Deep Litter in Poultry Houses on Internal Parasites."

MR. J. C. GRIMES, Auburn, Ala.: "Tour of Pastures of the Alabama Agricultural Experiment Station."

DR. L. E. HAWKINS (Ph.D.), Stillwater, Okla.: "Prospects for Regional Research."

DR. W. J. GIBBONS, Auburn, Ala., led an illustrated discussion on "Hyperkeratosis or X Disease of Cattle."

DR. R. S. SUGG, Auburn, Ala., led a discussion on "Regional Education in Veterinary Medicine."

DR. W. M. MOHLER, Washington, D.C.: "The Complement-Fixation Test in the Diagnosis of Anaplasmosis."

DR. E. S. TIERKEL, Montgomery, Ala.: "Preliminary Observations in Comparative Prophylactic Vaccination of Dogs Against Rabies with Living Virus Vaccines and Phenolized Vaccine."

s/D. E. HOWELL, *Secretary.*

California

Southern Association.—The monthly meeting of the Southern California Veterinary Medical Association was held at Los Angeles on March 16, 1949. Drs. Charles M. Carpenter (D.V.M., M.D.), University of California at Los Angeles, and C. H. Thienes (M.D.), University of Southern California, president and secretary, respectively, of the Medical Research Society of Southern California, discussed "The Humane Handling of Laboratory Animals."

s/C. E. WICKTOR, *Resident Secretary.*

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Excelsior Dairies Breed "Modern Cow."—Dr. C. L. Ranney, superintendent of the Excelsior dairies, believes that the "Ability of a cow to make high production records under machine operations is as much an inherited characteristic as good udders or sloping rumps." He has spent twelve years on a breeding program to prove this theory. Today, the 600-cow milking herd of the Excelsior dairies is the result of natural selection of cows that have proved their ability to milk well on machines. Every cow is machine-milked, and no hand-stripping is done.

The establishment of "milking-machine udders" as a hereditary characteristic has been one of the principal goals of the breeding program. These udders are basin-shaped, rather than extending forward in a straight line to the middle of the belly. Most striking is the flat floor and square teat placement. Rear udders are wide and strongly attached. When bagged before milking, the rear udder hangs straight from its high attachments, displaying little or no pear-shaped bulging.

Machine-milked cows at the Excelsior dairies produce an average of 80 lb. of butterfat per year more than the hand-milked strings of a dozen years ago. During that time, the modern milking program has cut labor costs from 10 cents to 8 cents per pound of fat.—*Western Dairy Journal, March, 1949.*

Connecticut

Fairfield County Association Organized.—On Jan. 12, 1949, veterinarians of Fairfield County and vicinity met in South Norwalk to organize the Fairfield County Veterinary Medical Association. The Constitution and By-Laws were drawn up and the following officers elected: Drs. Jean V. Smith, Norwalk, *president;* Earl Guthrie, Wilton, *president-elect;* and William R. Leggett, Westport, *secretary-treasurer.*

This Association is an affiliate of the Connecticut VMA, as are the Hartford and New Haven associations.

At the March meeting, the business session was followed by a demonstration of the intravenous administration of fluids in balances, including blood transfusions and administration of bulk fluids.

s/WILLIAM R. LEGGETT, *Secretary.*

Florida

Retired Veterinarians Meet in Florida.—Retired and semiretired veterinarians and their wives, who spend all or part of their time in Florida, held their third annual dinner meeting at the Manavista Hotel in Bradenton on March 9, 1949. Although a number had already returned north and some were ill, a total of 32 attended the dinner. Dr. H. H. Fairbank of Bradenton was chairman. At the next annual meeting of the group on Feb. 15, 1950, an attendance of 100 is expected and reservations should be made before Feb. 10, 1950. The dinner will again be held at the Manavista Hotel at 12:00 o'clock noon. For reservations, address any one of the committee: Drs. H. H. Fairbank, Bradenton, Fla.; Herbert L. Little, Bradenton; John H. Lenfestey, Bay View Hotel, Tampa; or A. J. DeFosset, 247 49th Ave., North, St. Petersburg 4.

The following veterinarians and their wives spent all or part of the past winter in Florida.

John R. Mohler	Robert E. Holm
Adolph Eichhorn	N. D. Backus
George Gillie	H. A. Dennewitz
H. H. Fairbank	J. S. Koen
John H. Lenfestey	C. M. Grubb
A. J. DeFosset	Wm. Hansen
H. L. Little	J. H. Odgers
R. E. Brookbank	C. E. Shipman
W. F. Biles	E. J. Hutson
H. E. Smith	L. A. Ruff
H. Busman	W. H. Ferguson
Paul Fischer	H. W. Peirce
S. E. Hershey	L. W. Goss

In addition to these, Col. and Mrs. S. G. Kielsmeier (retired); Col. and Mrs. C. E. Cook (retired); and Dr. Rudolph Snyder also spent the winter in Florida.

s/A. J. DEFOSSET.

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Personal.—Capt. Ernest L. Reed, Jr. (API '43), Pensacola, who has assisted his father in the latter's pet hospital since his discharge from the Army in 1947, returned to the Army in March, 1949. After a refresher course in meat inspection at the Meat and Dairy Hygiene School in Chicago, Dr. Reed will be stationed in Tacoma, Wash.

Georgia

Atlanta Officers.—Officers elected at the annual meeting of the Atlanta Veterinary Medical Association on Jan. 12, 1949, are Drs. Grover C. Thornton, *president;* J. L. Hopping, Sr., *vice-president;* and Alan D. Stevens, *secretary-treasurer.*

s/ALAN D. STEVENS, *Secretary.*

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South Georgia Association.—The South Georgia Veterinary Medical Association held its regular quarterly meeting on March 6, 1949, at the Sylvester Livestock Auditorium. Dr. L. E. Starr, of the Georgia Department of Health, explained the use of the new attenuated rabies vaccine, from an experimental standpoint, and Dr. Tom Sutton demonstrated castration of a colt in a standing position.

s/WM. L. SIPPEL, *Secretary.*

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North Georgia Association.—The North Georgia Veterinary Medical Association met in Athens, March 17, 1949, with 33 veterinarians in attendance. Dr. Edmund Hoffman discussed "Relation of Genetics to Veterinary Medicine"; Dr. Robert Wheeler spoke on "Endocrine Therapy"; and Dr. Frank Mullins presented his paper on "Laboratory Diagnosis in Medicine."

Officers elected at this meeting were Drs. W. T. Grant, Cartersville, *president;* C. L. Smith, Washington, *vice-president;* and Chas. C. Rife, Atlanta, *secretary-treasurer.*

s/CHAS. C. RIFE, *Secretary.*

Association Protests Lay Testers.—At the meeting of the Georgia Veterinary Medical Association on Jan. 16, 1949, the secretary was instructed to send a telegram to Dr. Simms, and to write Georgia's senators and representatives, protesting the proposed change in the Bureau of Animal Industry rules to permit lay testing for brucellosis. All Georgia representatives replied assuring careful consideration of the matter.

Drs. Fred Allen, Elberton; T. C. Ross, McRae; R. F. Thomas, Atlanta; and Chas. C. Rife, Atlanta, were appointed by Governor Talmadge to serve on the Veterinary Examining Board. Those retired from the Board were Drs. J. W. Salter, *president;* C. C. Von Gremp, O. N. Mathis, and J. M. Sutton. Dr. C. A. Moody is the only former member remaining in office, and his term of office expires this year.

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Health Department Reports on Rabies.—Rabies in the state as a whole has been reduced to the lowest point in twenty-five years. Rabies in foxes has continued to be troublesome, but it is hoped that it will be eliminated during 1949.

Canine rabies remains enzoötic in the metropolitan area of Atlanta and the adjoining counties. Savannah had a serious outbreak with 58 positive canine cases and 6 in cats. A single human case occurred in Savannah.

Veterinarians are requested to report vaccination and elimination of stray animals on the first of each month, so that the health department may be informed on the status of the disease at all times.

Illinois

State Officers.—Officers elected at the sixty-seventh annual meeting of the Illinois State Veterinary Medical Association in Springfield on Jan. 26-28, 1949, are Drs. R. M. Carter, Alexis, *president;* C. L. Miller, Oak Park, *president-elect;* and A. G. Misener, Chicago, re-elected *secretary-treasurer.*

s/A. G. MISENER, *Secretary.*

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Eastern Association.—The spring meeting of the Eastern Illinois Veterinary Medical Asso-

In attendance at the dinner meeting of the Institute on Public Health Practices for Veterinarians at Springfield on March 21-23, 1949.
(Left to right)—Drs. R. C. Klussendorf, James H. Steele, Roland R. Cross (M.D.), Jerome J. Sievers (M.D.), L. R. Davenport, Mr. Roy E. Yung, Drs. C. S. Bryan, R. M. Carter, N. H. Howlett, and C. E. Fidler.

ciation was held March 31, 1949, at the Hotel Tilden Hall, Champaign. Dr. R. E. Witter spoke on "Dehydration and Replacement Therapy," and Dr. C. C. Morrill was moderator of a "Symposium on Large Animal Diseases."

s/J. O. ALBERTS, *Secretary.*

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Northern Association.—The Northern Illinois Veterinary Medical Association met April 13, 1949, in the Hotel Faust, Rockford. After the business meeting, the scientific program was presented.

DR. ROBERT SCOTT, Allied Laboratories, Sioux Falls, S. Dak.: "Current Swine Problems."

MR. C. M. VESTAL, professor of animal husbandry, Purdue University, Lafayette, Ind.: "Swine Nutrition."

DR. I. FOREST HUDDLESON, professor of veterinary bacteriology, Michigan State College, East Lansing: "Mucoid Vaccine and Its Use."

DR. M. E. MANSFIELD, director of veterinary extension, University of Illinois, Urbana: "Report on Experiment 42."

DR. J. T. FOLEY, Curtiss Candy Company Farms: "Experiences with Mucoid Vaccine." DR. H. P. WESSELS, Geneva, Ill., led a discussion on these papers. Others who participated are DRS. C. E. FIDLER, Division of Livestock Industry, Springfield; and J. T. SCHWAB, Division of Livestock Sanitation, Madison, Wis.

s/A. A. LEGNER, *Secretary.*

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Mounting Incidence of Rabies.—The ineffectiveness of local rabies-control measures is reflected in the mounting prevalence of the disease in the southern perimeter of Chicago where rabies in dogs has been rampant during the last three years. Based on the cases reported to the health authorities, the midwinter incidence was three times greater than for the previous year. The ratio was 16 cases compared with 5 cases during the corresponding period of 1948, despite the diligent efforts of the Cook County Health Department. Involved, but not included in the report, are the important industrial centers of northern Indiana and adjacent Will County. The rabies situation of the region (involving two states and three counties) shows up the futility of noncentralized measures against an animal disease of that type.

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BCG Vaccination in Chicago.—Although BCG vaccination, now more than a quarter of a century old, was slow in arousing interest in its merits in this country, the work of Dr. Sol Roy Rosenthal and coworkers, at the Chicago Municipal Sanitarium, has attracted worldwide attention. *Annales de L'Institut Pasteur* (Dec., 1948) published two leading articles by these authors, one on the use of vaccine in powdered form and another on the study of the modified bacillus under electronic microscopy. The casual mention of the Calmette-Guerin bacillus in veterinary literature stems from the prospect it holds out in combating bovine tuberculosis which, at the present time, is not known.

Indiana

Michiana Association.—The Michiana Veterinary Medical Association met on March 10, 1949, in Elkhart, Ind. Dr. Harry J. Magrane II, Mishawaka, Ind., presented two motion pictures, one pertaining to the training of dogs, and the other showing the various gaits of saddle and racing horses in slow motion. A third picture, prepared by the U.S. Public Health Service, pertained to rabies and its control.

Association officers are Drs. George Frier, Benton Harbor, Mich., *president;* Allen Winter, Benton Harbor, *vice-president;* and Raymond Worley, South Bend, Ind., *secretary-treasurer.*

s/FRANK R. BOOTH, *Resident Secretary.*

Iowa

East Central Society—The East Central Iowa Veterinary Medical Society met on March 10, 1949, in the Hotel Roosevelt, Cedar Rapids. Fifty-five veterinarians from 17 counties were in attendance. The scientific program follows.

DR. I. W. MORANVILLE, Peoria, Ill., Vitamineral Products Co., Peoria, Ill.: "Mineral and Vitamin Deficiencies of Livestock." DR. P. V. NEUZIL, Blairstown, led the discussion on this paper.

DR. E. M. BERROTH, inspector in charge, Meat Inspection Division, U. S. Bureau of Animal Industry, Cedar Rapids: "Anasarca of Cattle."

DR. WARREN E. BOWSTEAD, Lowden: "The Phenomena of Vitamin A Deficiency."

DR. JOHN W. CAREY, West Liberty: "The Use of Antihistamines in Vitamin A Deficiencies of Cattle."

DR. M. H. WALLINGA, Cedar Rapids: "Case Report on a Foundered Bull Treated with Antihistamine."

DR. S. G. PAUL, Clarence: "Laminitis."

DR. DAVID H. UNGS, Dyersville: "Vitamin and Mineral Deficiencies of Swine."

DR. ORLO L. HAIGHT, Mount Vernon: "Case Reports on Swine."

DR. L. PROCTOR, Oelwein: "Case Reports on Deficiencies in Cattle."

DR. R. E. ELSON, Vinton: "Listerellosis of Cattle."

The following reports were presented on rabies.

Drs. John B. Bryant, Mount Vernon, "Rabies"; Tom T. Bowstead, Riverside, "Rabies in a Squirrel and a Dog"; G. P. Shindel, DeWitt, "Rabies in a Dog"; Robert E. Savage, Monticello, "Army Experience in Control of Rabies"; I. P. Irwin, Iowa City, "Canine Rabies"; H. U. Garrett, chief, Division of Animal Industry, Iowa Department of Agriculture, Des Moines, "Measures Undertaken to Control Rabies in Des Moines"; Iva Dunn, Atkins, "Rabies in Cattle"; W. S. O'Brien, Ryan, "Rabies in Sheep"; and J. L. Beaver, Brooklyn, "Rabies in Dogs."

s/E. C. HOWE, *Secretary.*

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Fayette County Association.—Seventeen veterinarians from seven counties attended the dinner meeting of the Fayette County Veterinary Association on March 14, 1949. The scientific program follows.

DR. I. W. MORANVILLE, Vitamineral Products Co., Peoria, Ill.: "Vitamin and Mineral Deficiencies of Livestock" (with illustrations).

DR. R. M. HOFFERD, Cedar Rapids: "Swine Practice Problems." The discussion on this paper was led by DR. L. PROCTOR, Oelwein, with DRS. F. C. O'DONNELL, Strawberry Point;

G. P. BRANDT, Garnavillo; R. M. COCKING, Monona; R. C. RIPPLE, New Hampton; and DONALD E. MOORE, Decorah, participating in the discussion.

DR. C. W. BROWN, veterinarian in charge, U. S. Bureau of Animal Industry, Des Moines: "Testing Cattle for Tuberculosis and Brucellosis in Iowa."

DR. V. C. WILLIS, Waucoma; K. L. RITCHIE, West Union; and M. F. FREVERT, West Union, discussed Dr. Brown's paper.

s/R. M. COCKING, *Secretary.*

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Cedar Valley Association.—The Cedar Valley Veterinary Association met in Waterloo on March 14, 1949. Thirty-eight veterinarians, representing 16 counties attended this meeting. Dr. C. D. Lee, extension specialist, Iowa State College, Ames, spoke on "Baby Chick Diseases." Dr. J. W. Cunkleman, Fort Dodge, discussed "Bovine Sterility." Drs. C. C. Lawrence, Grundy Center; and A. J. McIntosh, La Porte City, gave illustrative case reports. Drs. C. B. Strain Dunkerton; Isaac E. Hayes, Waterloo; Benj. Rosenfeld, Osage; L. L. Boxwell, Cedar Falls; and H. S. Lames, Dysart, discussed Dr. Cunkleman's paper.

s/C. B. STRAIN, *Secretary.*

Louisiana

Association Officers.—Officers of the Louisiana State Veterinary Medical Association elected at the eighteenth annual Short Course for Veterinarians, at the Louisiana State University, Feb. 8-9, 1949, are Drs. C. McHenry Greer, Winnsboro, *president*; C. M. Heflin, Baton Rouge, *vice-president*; and R. B. Lank, Baton Rouge, *secretary-treasurer.*

s/R. B. LANK, *Secretary.*

Massachusetts

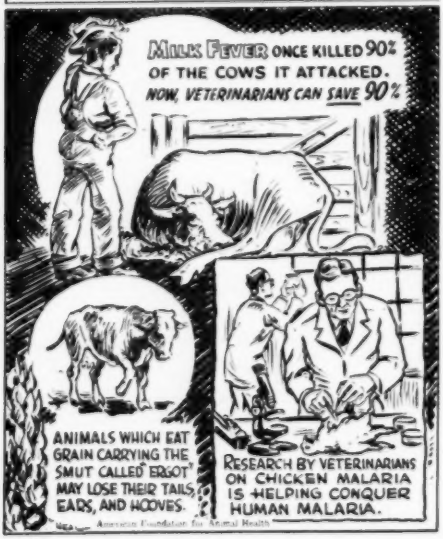
State Association.—The regular monthly meeting of the Massachusetts Veterinary Association was held March 23 at the Hotel Statler. Dr. Ellis P. Leonard, professor and head of the Department of Veterinary Therapeutics and Small Animal Diseases, New York State Veterinary College, Cornell University, Ithaca, N. Y., spoke on "Anesthesia in Small Animal Practice."

Dr. Leonard was moderator of a panel discussion on "Distemper, Hard Pad Disease, and Closely Related Entities." Other panel members were Drs. David L. Coffin and John Bentinck-Smith of the Angell Memorial Animal Hospital, Boston; and Ralph Povar of the Povar Animal Hospital, East Providence, R. I.

The April 13 meeting was held at the Hotel Statler in Boston. Dr. Jacques Jenny, of Switzerland, now in the Department of Surgery, School of Veterinary Medicine, University of Pennsylvania, spoke on "The Kuntscher Method of Medullary Nailing in Canine Fractures" (with illustrations). Dr. Erwin F. Schroeder, chief of staff, the Angell Memorial Animal Hospital, Boston, led the discussion which followed.

s/C. LAWRENCE BLAKELY, *Secretary.*

LIVESTOCK HEALTH ODDITIES


MILK FEVER ONCE KILLED 90% OF THE COWS IT ATTACKED. NOW, VETERINARIANS CAN SAVE 90%
ANIMALS WHICH EAT GRAIN CARRYING THE SMUT CALLED ERGOT MAY LOSE THEIR TAILS, EARS, AND HOOVES.
RESEARCH BY VETERINARIANS ON CHICKEN MALARIA IS HELPING CONQUER HUMAN MALARIA.

Michigan

Southeastern Association.—At the March 9, 1949, meeting of the Southeastern Michigan Veterinary Medical Society, Dr. J. G. Hardenbergh, executive secretary of the AVMA, spoke on the progress of the national meeting in Detroit. Dr. C. F. Cairy, Michigan State College, discussed "Hormones" at the scientific meeting and later entertained members and the women's auxiliary as an amateur magician.

On April 13, the Society met at the Herman Keifer Hospital, Detroit. Captain Will Judy spoke on "What is Wrong with the Veterinary Profession as the Layman Sees It." Captain Judy is editor of *Dog World Magazine* and, as an international judge of dogs, he has traveled 77,000 miles in the last two years to judge shows in Mexico City, Havana, Chile, Rio de Janeiro, Dublin, Belfast, and Anchorage, Alaska.

s/W. N. KONDE, *Secretary.*

Missouri

Kansas City Association.—The Kansas City Veterinary Medical Association held a monthly meeting on March 15, 1949, in the Hotel Continental. Dr. F. M. Baldwin, of the Laboratory Diagnostic Division, Corn States Serum Company, Omaha, Neb., discussed "Plants Harmful to Domestic Animals." Formerly, Dr. Gesellchen practiced at Mason City, Iowa.

s/EARL L. MUNDELL, *Secretary.*

• • •

Personal.—Miss Mary Ann Seipel, daughter of Dr. (KCVC '08) and Mrs. J. R. Seipel, Poplar Bluff, won the title "Missouri State Pilgrim" in an American history contest conducted by the Daughters of the American Revolution. Mary Ann, a senior in the Poplar Bluff high school, received a citizenship pin, a certificate of award, and a $100 U.S. savings bond.

s/J. R. SEIPEL.

Nebraska

North Eastern Association—The annual meeting of the North Eastern Nebraska Veterinary Medical Association was held on March 17, 1949, in Norfolk, with approximately 70 veterinarians in attendance. The programs of these meetings are based on a question box and discussions of local problems.

Officers of the Association are Drs. W. J. Price, Wisner, *president;* and F. O. Lundburg, Wausa, *secretary-treasurer.* The Association will meet again in March, 1950, in Norfolk.

s/PAUL L. MATTHEWS, *Resident Secretary.*

New Hampshire

State Association.—On Feb. 25, 1949, the New Hampshire Veterinary Medical Association met in Concord. Dr. Eric Simmons, North Hampton, told of his experience with UNRRA, and Dr. Forrest Tenney, Peterboro, discussed "Vibrionic Abortion."

Newly elected officers are Drs. F. L. Clark, Nashua, *president;* Wilson Haubrich, Claremont, *vice-president;* and Fred Allen, Durham, *secretary-treasurer.* Drs. Carl Chase, Concord; Melvin Hale, Wolfboro; and Eric Simmons, North Hampton, were elected to the *Executive Committee.*

s/FRED E. ALLEN, *Resident Secretary.*

New Jersey

Precautions Against Foot-and-Mouth Disease.—The New Jersey legislature has passed a law which provides for immediate reporting of suspected cases of foot-and-mouth disease, its prompt diagnosis, statewide quarantine and sanitary measures, and indemnity payments.

In an official publication of the State Department of Agriculture, Dr. R. A. Hendershott explained that "although New Jersey is far distant from Mexico, transportation facilities centered around New York City provide favorable channels for the spread of the disease through contact with persons who have been . . . in Mexican provinces."

New York

Summer Fellowship for Graduate Veterinarian.—The New York Zoölogical Society announces a summer fellowship for a graduate veterinarian at the New York Zoölogical Park (Bronx Zoo). The facilities of the animal hospital including two laboratories equipped for pathology, bacteriology, parasitology, and hematology, autopsy room, operating room, x-ray room, animal quarters, and an excellent library will be available for the fellow. The successful applicant will have the opportunity of undertaking a research project of his own, as well as participating in projects under way. Clinical medicine will also be included in the summer work.

The stipend for three months—June 15 through September 15—will be $500. Dormitory accommodations can be arranged at the Park.

Qualifications include a degree in veterinary medicine from a college approved by the American Veterinary Medical Association, with special interest in such fields as zoölogy, wildlife management, comparative anatomy, physiology, bacteriology, parasitology, and pathology.

For further information, write to Dr. Leonard J. Goss, veterinarian, New York Zoölogical Society, Zoölogical Park, New York 60, N. Y.

s/LEONARD J. GOSS.

• • •

New York City Association.—The regular meeting of the Veterinary Medical Association of New York City, Inc., was held at the Hotel Statler on April 6, 1949. Dr. Mark Allam, associate professor of surgery, School of Veterinary Medicine, University of Pennsylvania, discussed "The Surgical Approach for Diagnosing and Prognosing Foreleg Paralysis in the Dog" (with illustrations).

s/C. R. SCHROEDER, *Secretary.*

Ohio

Grant to Conference Fund of Veterinary College.—The Robert Gould Research Foundation has made a grant of $1,000 to the conference fund of the College of Veterinary Medicine at The Ohio State University. This grant will enable the College to hold a one-day program on dairy cattle nutrition in connection with the Annual Conference for Veterinarians on June 15-17, 1949, as a part of the over-all 75th anniversary celebration of The Ohio State University.

Last year, the Foundation made a similar grant for a session on swine nutrition. These grants on nutrition are the first of their kind being sponsored by the Foundation in the field of veterinary science. The Robert Gould Research Foundation is a nonprofit corporation dedicated to the public health and welfare and devoted primarily to the advancement of the science of nutrition.

Dean Walter R. Krill, of the College of Veterinary Medicine, said that the value of these annual conferences has been so appreciated by veterinarians that last year 400 attended from every section of the United States and several foreign countries.

The program on nutrition of dairy cattle is scheduled for June 16, the second day of the conference.

Pennsylvania

Keystone Association.—The Keystone Veterinary Medical Association met on March 23, 1949, at the School of Veterinary Medicine, University of Pennsylvania, Philadelphia. Dr. S. F. Scheidy spoke on "Some Pharmacologic Characteristics of Penicillin in Dogs," and the motion picture "Man-Made Miracle" was shown.

s/RAYMOND C. SNYDER, *Secretary.*

• • •

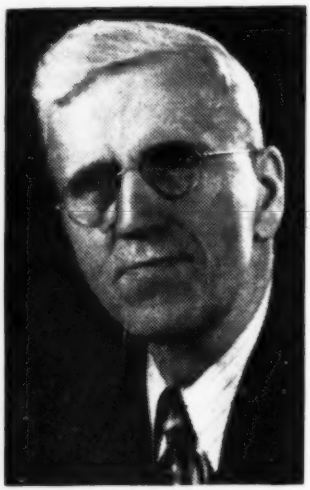
Personal.—Dr. Donald G. Lee, Drexel Hill, has been nominated as resident secretary to the American Veterinary Medical Association to represent the Pennsylvania State VMA.

s/R. C. DAYTON.

Quebec

Veterinary School Catalogue.—The *École de Médecine Vétérinaire* has issued its second

prospectus since leaving the campus of the University of Montreal. As previously announced in these columns, the school is now located at Saint Hyacinthe, 35 miles southeast of Montreal. It is the only French veterinary school in America. It was founded as a private enterprise in 1886 by Dr. V. T. Daubigny and was affiliated with the Montreal section of Laval University in 1899 under the name of *Ecole de Médecine Comparée et de Science Vétérinaire* and placed under the administration of the provincial minister of agriculture. After moving about several times, the institution was moved to the rural community, La Trappe, in 1928. In 1947, under the influence of the Hon. Laurent Barré, minister of agriculture, the school was taken under the wing of the Province of Quebec and installed in public buildings at its present location. The teaching staff comprises 27 members, 19 of whom have degrees in veterinary medicine acquired at Cornell University (3), Iowa State College (1), Alfort (1), and home (14). Scattered among the faculty members are degrees acquired at Laval University, McGill University, the University of Montreal, and University of Wisconsin. The five-year course covers the usual branches of veterinary science.



The Hon. Laurent Barré, minister of agriculture and protector of veterinary education, province of Quebec.

Wisconsin

Milwaukee Association.—The Milwaukee Veterinary Medical Association held its regular monthly meeting in the lecture hall of the Wisconsin Humane Society on March 15. The program featured an open discussion of general practice problems.

s/K. G. NICHOLSON, *Secretary.*

• • •

Rock Valley Association.—On Feb. 23, 1949, the Rock Valley Veterinary Medical Association held its regular monthly meeting at the Wisconsin Dairy Cattle Market, Janesville. Usually, the programs consist of an open discussion of problems confronting the practitioners of this area. At this meeting, "Brucellosis Testing of Cattle for Farm Auctions" was discussed.

New officers of the Association are Drs. R. F. Smith, Bellville, *president;* J. Welsh, Clinton, *vice-president;* and E. W. Krueger, Evansville, *secretary-treasurer.*

s/E. W. KRUEGER, *Secretary.*

• • •

Dane County Association.—The Dane County Veterinary Medical Association met at the Wisconsin Memorial Union, Madison, for their regular meeting on March 3, 1949. Dr. R. H. Romacher, Madison, discussed "Otitis Externa in Dogs," and Dr. John Ehlenfeld, Waterloo, Wis., held a question and answer period on "Problems in Large Animal Practice."

s/W. R. PRICHARD, *Secretary.*

FOREIGN NEWS

England

The Slaughter of Young Horses.—The slaughtering of young horses, particularly for the London meat market, by farmers and their agents has been found difficult to control and, as a result, horses of the finest type and breeds with many years of usefulness ahead are being sacrificed to the demand for meat, unknown to the consuming public. Unable to find witnesses willing to come forward against violators of the regulations, the Ministry of Food is not able to put an end to the practice.—*From Vet. Rec., Nov. 6, 1948.*

• • •

Canine Research Fund.—For the second consecutive year, the National Greyhound Racing Society has donated £50,000 to the Canine Section of the Animal Health Trust in spite of the high taxation imposed on dog racing. The contribution testifies to the importance attached to the dog industry.

• • •

CARE for Dogs.—The Royal SPCA and the Animal Health Trust, London, have agreed to handle the distribution of dog food shipped by Americans under a plan developed by the American SPCA and the Gaines Dog Research Center.

Cash contributions may be sent to the ASPCA, 50 Madison Ave., New York 10, N. Y., specifying its use for British dogs, and all details will be attended to by them. Every cent will be used to purchase, at wholesale prices, dog food containing the highest nutritional value and which can be best adapted for overseas shipment. Each shipment will include various sized packages, assorted in line with the needs of the English recipients, as reported by the coöperating British distributing bodies.

Reports reaching this country are that England's austerity diet is putting its pinch on dogs in even greater measure than on people. As a result of the impoverished diet, according

to *Science News Letter*, English dogs now require nearly double the veterinary care they received before World War II. Among the ailments currently prominent among dogs are rickets, slow convalescence after illness, slow healing of broken bones, and skin troubles. It is concern with the humane aspects of this problem that led the ASPCA to serve as a cosponsor of this food-for-British-dogs project, while the interest of the Gaines Dog Research Center is principally in safeguarding and preserving the bloodlines from which so many American dog breeds are descended.

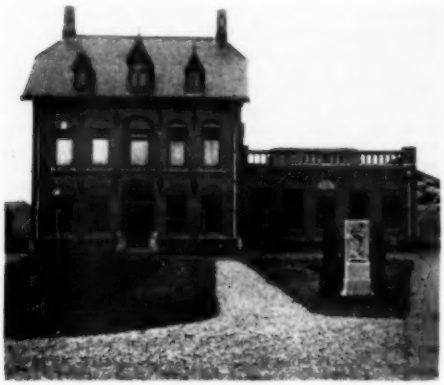
Japan

Japan's Veterinary Service.—The supreme command of the Allied powers maintains a Veterinary Affairs Division in its Public Health and Welfare Section that deals with the health and postslaughter inspection of cattle, horses, swine, sheep, and goats; and research and investigational work pertaining to milk, meat, seafood, and abattoir and dairy farm inspection. Press releases on the current veterinary service should not, however, be construed as a postwar reform but rather as a return to the *status quo ante*. The practical application of veterinary knowledge in Japan had always kept pace with that of the Western nations.

The Netherlands

Campus Monument.—A monument erected "in memory of the Dutch veterinarians and veterinary students who had been murdered or tortured to death by the German oppressors" has been placed on the campus of the Veterinary Faculty of the State University of Utrecht by the Dutch Veterinary Medical Association. It shows a dying figure handing the Dutch veterinary symbol to a younger and stronger figure. This Dutch symbol shows the historic or legendary veterinarian, Absyrtus, kneeling before a horse and holding a dish for the animal.

The pictures were sent by Dr. Jacob Jansen, director of the Institute for Parasitic and Infectious Diseases, Utrecht, who interprets the inscription on the monument as follows, "In Alliance with them Realizing the Ideals 1940—1945." Dr. Jansen will be remembered for his attendance at the AVMA convention in Cincinnati in 1947, and his presentation there of a paper titled "Paratuberculosis."—*C. H. Haasjes, D.V.M., Shelby, Mich.*



Veterinary Surgery Building and monument to veterinary casualties of World War II in foreground on the campus of the Veterinary Faculty, State University of Utrecht, The Netherlands.

Monument erected by the Dutch Veterinary Medical Association in memory of the Dutch veterinarians and veterinary students who died during World War II.

New Zealand

Human Tuberculosis of Avian Origin.—A case of extrapulmonary tuberculosis in a girl 14 years old was found to be due to the avian type of *Mycobacterium tuberculosis* in typing

the organism involved.—*From New Zealand M. J., Sept., 1948.*

Spain

Virulent Outbreak of Avian Pneumoencephalitis.—Millions of chickens have died of pneumoencephalitis (Newcastle disease) since the nation was hit by a virulent and wide-sweeping outbreak early in 1947. Entire flocks have been wiped out and there have been heavy losses in egg production. Recently, however, the national veterinary service has developed a vaccine which has helped to curb loses, according to the *World's Poultry Science Journal* (Oct.-Dec., 1948).

STATE BOARD EXAMINATIONS

Florida—The Board of Veterinary Examiners will hold examinations on June 27-29, 1949, at the Everglades Hotel, Miami, Fla. Address inquiries to H. C. Nichols, secretary, Ocala, Fla.

Iowa—The Iowa Veterinary Medical Examining Board will hold examinations for the licensing of veterinarians on June 13 and 14, 1949. Applicants are asked to be in the office of the Division of Animal Industry, State House, Des Moines, Iowa, not later than 8 o'clock on the morning of June 13. For further information, write Dr. H. U. Garrett, chief, Division of Animal Industry, State House, Des Moines 19, Iowa.

Ohio—The Board of Veterinary Examiners of Ohio will hold examinations on June 7-8, 1949, in the Clinic Building, College of Veterinary Medicine, The Ohio State University, Columbus. Applicants must be present at 8 a.m. on June 7. Those who are not graduates of The Ohio State University, should supply the Division with a photograph of head and shoulders and a photostatic copy of certificate of graduation not later than May 31, 1949. Address Chief, Division of Animal Industry, Room 709, State Office Building, Columbus 15, Ohio.

MARRIAGES

Dr. Thomas S. Leith (ISC '14), Ames, Iowa, to Mrs. Mae Trindle White, Ames, Iowa, on Jan. 10, 1949.

Mr. Charles S. Travers, executive secretary of the California State Veterinary Medical Association, and Miss Lillian E. Johnson, Chicago, Ill., on March 24, 1949, in California.

BIRTHS

Dr. (OSU '41) and Mrs. Stanley R. Cooper, Beverly Hills, Calif., announce the birth of a son, Rodney Edward, on Dec. 4, 1948.

Capt. (ISC '37) and Mrs. Lloyd V. Fry, 1819 W. Pershing Rd., Chicago, Ill., announce the birth of their third daughter, Kyle Kristine, on Jan. 20, 1949, Kyle Kristine is the granddaughter of Dr. and Mrs. Harry J. Fry, Kalona, Iowa.

Dr. (KSC '43) and Mrs. Fred B. Ogilvie, Kansas City 2, Kan., announce to birth of a son, Fred Kimbrough, on Feb. 9, 1949.

Dr. (TEX '43) and Mrs. C. L. Schwartz, Alton, Ill., announce the birth of their fifth child, Kathleen Sue, on Feb. 22, 1949.

Dr. (CORN '42) and Mrs. Frederick B. Pulling, Jr., announce the birth of Frederick Bunnell Pulling III on March 27, 1949.

DEATHS

J. Butters (ONT '94), Renville, Minn., died Dec. 13, 1948. Dr. Butters had been a member of the AVMA for forty years.

★Louis V. Cowton (ST. JOS '21), 62, Audubon, Iowa, died on Feb. 16, 1949. Dr. Cowton had been employed by the U. S. Bureau of Animal Industry in Springdale, Ark., before moving to Audubon. He was admitted to the AVMA in 1947.

W. C. Hines (MC K '12), Los Angeles, Calif., died on Feb. 25, 1949. Dr. Hines practiced for many years at Kenesaw, Neb. He entered government service in 1938 and was assigned to tuberculosis eradication in Nebraska. Later, he entered meat inspection and worked at Denver, Colo., Nampa, Idaho, and Los Angeles. Dr. Hines was a member of the National Association of Federal Veterinarians.

★James S. Spikes (ST JOS '09), 60, Brownsville, Texas, died of pneumonia Oct. 17, 1948. Dr. Spikes' early practice was in Bonham, Texas. After serving as captain in the Veterinary Corps with the American Expeditionary Forces in World War I, he was city veterinarian in Brownsville, where he practiced until his death. Dr. Spikes also served a number of years on the Texas State Board of Veterinary Examiners and was a member of the AVMA.

George F. Townsend (KCVC '13), Sedalia, Mo., died on Oct. 23, 1948. Dr. Townsend had been engaged in milk inspection.

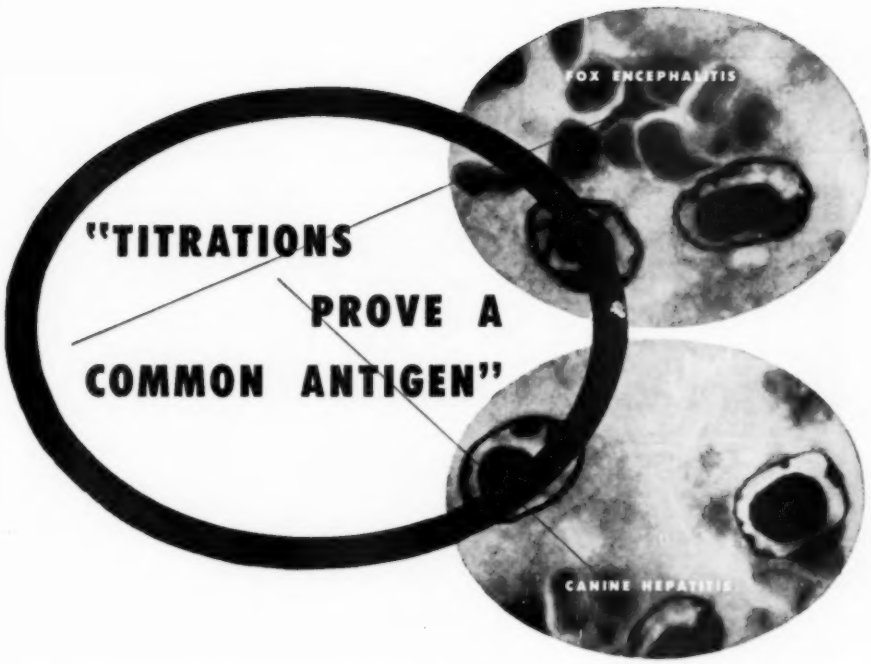
★Walter B. Van Cleave (IND '09), 63, Peoria, Ill., died on Feb. 19, 1949. Dr. Van Cleve had been county veterinarian for twenty-five years and had contributed much time and energy to the tuberculosis and brucellosis eradication programs. A charter member of the newly formed Illinois Valley Veterinary Medical Association, Dr. Van Cleave was also a member of the Illinois State VMA, the Mississippi Valley VMA, the U. S. Livestock Sanitary Association, and the AVMA.

William H. Wallace (KCVC '09), Kiowa, Kan., died on Jan. 3, 1949. Dr. Wallace had been a member of the AVMA.

★Carlton J. Wright (CVC '11), 62, Cerro Gordo, Ill., died on Feb. 25, 1949. Dr. Wright was a member of the Illinois Veterinary Medical Association and of the AVMA.

A. E. Zimmer, (OSU '12), Cincinnati, Ohio, died Dec. 26, 1948.

★Indicates members of the AVMA.



Results of recently conducted virus titrations* have corroborated the observations of Rubarth; i.e., fox encephalitis and canine hepatitis have common antigenic properties. They are identical morphologically, in staining characteristics and cannot be differentiated microscopically.

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COMING MEETINGS

Florida, Northeast Florida Veterinary Medical Association. Quarterly meeting. At the Agricultural Experiment Station, Gainesville, Fla., 2:00 p.m., May 4, 1949. J. P. Young, Jr., Rt. 1, Box B, Jacksonville, Fla., secretary.

American Animal Hospital Association. Annual meeting. Edgewater Beach Hotel, Chicago, Ill., May 5-7, 1949. Wayne H. Riser, Box 872, Evanston, Ill., secretary.

Society of American Bacteriologists. Annual meeting. Netherland Plaza Hotel, Cincinnati, Ohio, May 16-20, 1949. George R. Weber, Environmental Health Center, U. S. Public Health Service, Cincinnati 2, Ohio, chairman.

Iowa, practitioners' clinic of the Eastern Iowa Veterinary Medical Association. Annual meeting. Dairy Cattle Congress Grounds, Waterloo, Iowa, May 26, 1949. Laurance P. Scott, Box 325, Waterloo, Iowa, secretary.

Missouri Veterinary Medical Association. Annual meeting. Hotel Jefferson, St. Louis, Mo., June 6-7, 1949. J. L. Wells, Box 676, Kansas City, Mo., secretary.

Oklahoma State Veterinary Medical Association, summer meeting, and Conference for Veterinarians. School of Veterinary Medicine, Oklahoma A. & M. College, Stillwater, June 6-7, 1949. Lewis H. Moe, School of Veterinary Medicine, Oklahoma A. & M. College, Stillwater, Okla.

Alabama Polytechnic Institute. Annual conference for veterinarians. Alabama Polytechnic Institute, Auburn, Ala., June 7-9, 1949. Dr. J. E. Greene, Cary Hall, A.P.I., Auburn, Ala., chairman.

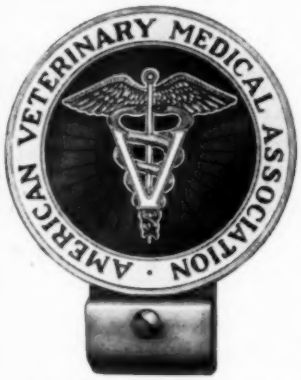
Texas Veterinary Conference, A. & M. College of Texas. Annual conference. School of Veterinary Medicine, College Station, June 9-10, 1949. R. D. Turk, A. & M. College of Texas, College Station, Texas, chairman.

Kansas State College. Annual conference for veterinarians. Veterinary buildings, Kansas State College, Manhattan, June 9-10, 1949. E. E. Leasure, dean.

Georgia State Veterinary Medical Association. Annual meeting. Atlanta Biltmore Hotel, Atlanta, Ga., June 13-14, 1949. Chas. C. Rife, 420 Edgewood Ave., N.E., Atlanta, Ga., secretary.

Ohio State University, The. Annual conference for veterinarians. College of Veterinary Medicine, The Ohio State University, Columbus, June 15-17, 1949. R. E. Rebrassier, College of Veterinary Medicine, The Ohio State University, Columbus 10, Ohio, chairman.

(*Continued on page 26*)



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(*Continued from page 24*)

Washington, State College of. Annual conference for veterinarians. College of Veterinary Medicine, State College of Washington, June 15-17, 1949. R. E. Nichols, dean.

Maryland State Veterinary Medical Association. Summer meeting. Hotel George Washington, Ocean City, Md., June 16-17, 1949. J. Walter Hastings, Sr., Cambridge, Md., secretary.

Wisconsin Postgraduate Conference for Veterinarians. University of Wisconsin, Madison, Wis., June 21-23, 1949. W. R. Pritchard, Department of Veterinary Science, the University of Wisconsin, Madison, chairman, Conference Committee.

Vermont State Veterinary Medical Association. Annual meeting. Lake Morey Inn, Fairlee, Vt., June 22-23, 1949. W. D. Bolton, Burlington, Vt., secretary.

New York State Veterinary Medical Society. Annual meeting. Pennsylvania Hotel, New York City, June 23-25, 1949. J. S. Halat, 1231 Gray Ave., Utica, N. Y., secretary.

Alberta Veterinary Medical Association. Annual meeting. Calgary, Alta., June 24-25, 1949. J. C. Wainright, Calgary, Alta., secretary.

North Carolina Veterinary Medical Association. Annual meeting. Carolina Beach, N. Car., June 28-29, 1949. J. H. Brown, Tarboro, N. Car., secretary.

Northwest Veterinary Medical Association (Oregon, Washington, and British Columbia). Annual meeting. Empress Hotel, Victoria, British Columbia, on June 28-30, 1949. F. W. B. Smith, 602 Credit Foncier Bldg., Vancouver, B. C.

American Veterinary Medical Association. Annual convention. Book-Cadillac and Statler Hotels, Detroit, Mich., July 11-14, 1949. J. G. Hardenbergh, American Veterinary Medical Association, 600 S. Michigan Ave., Chicago 5, Ill., executive secretary.

Maine Veterinary Medical Association. Quarterly meeting. Portland, Maine, July 13, 1949. S. W. Stiles, Falmouth Foreside, Maine, secretary.

Kentucky Veterinary Medical Association. Summer meeting. Seelbach Hotel, Louisville, Ky., Aug. 17-18, 1949. Ross Brown, University of Kentucky, Lexington, Ky., secretary.

Colorado State Veterinary Medical Association. Annual meeting. Shirley Savoy Hotel, Denver, Colo., Sept. 29-30, 1949. W. P. Blake, 2410 8th Ave., Greeley, Colo., secretary.

Pennsylvania State Veterinary Medical Association. Annual meeting. Bedford Springs Hotel, Bedford Springs, Pa., Oct. 5-7, 1949. Raymond C. Snyder, Walnut St. and Copley Rd., Upper Darby, Pa., secretary.

Chief Livestock Sanitary Officials. National Assembly. The Neil House, Columbus, Ohio, Oct. 10-11, 1949. Dr. C. F. Clark, State Office Building, Lansing 13, Mich., secretary.

United States Livestock Sanitary Association. Annual meeting. The Neil House, Columbus, Ohio, Oct. 12-14, 1949. Dr. R. A. Hendershott, 1 West State St., Trenton 8, N. J., secretary.

Iowa, Eastern Veterinary Medical Society. An-

(*Continued on page 28*)

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[1]Chavance, J. Vet. Med. 41: (1946) 199-201

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100 lb. drum	36c per lb.

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Sulfanilamide Powder U.S.P.

1 lb. bottle	$1.80 per lb.
5 lb. drum	1.75 per lb.
10 lb. drum	1.70 per lb.
25 lb. drum	1.65 per lb.
100 lb. drum	1.55 per lb.

Sulfathiazole Powder U.S.P.

1 lb. bottle.....$4.95 per lb.

Sulfathiazole Sodium Powder U.S.P.

1 lb. bottle.....$4.95 per lb.

Sulfapyridine Sodium Powder

1 lb. bottle.....$10.00 per lb.

Write for Complete Price List
Terms 1% 10 days F.O.B. Chicago
Freight Allowed on Shipments of 100 Lbs. or More
Prices Subject to Change Without Notice

AMERICAN CHEMICAL CO.

Fine Chemicals for the Veterinary Profession
1116 West 37th Street, Chicago 9, Illinois

(*Continued from page 26*)

nual meeting. Hotel Montrose, Cedar Rapids, Oct. 20-21, 1949. Laurance P. Scott, P. O. Box 325, Waterloo, Iowa, secretary.

American Public Health Association. Annual meeting. Hotels Statler and New Yorker, New York City, Oct. 24-28, 1949. Dr. Reginald Atwater, American Public Health Association, 1790 Broadway, New York, N. Y., executive secretary.

Southern Veterinary Medical Association. Annual meeting. Thomas Jefferson Hotel, Birmingham, Ala., Nov. 7-9, 1949. A. A. Husman, 320 Agricultural Bldg., Raleigh, N. Car., secretary.

Nebraska State Veterinary Medical Association. Annual meeting. Cornhusker Hotel, Lincoln, Neb., Dec. 7-9, 1949. L. V. Skidmore, College of Agriculture, Lincoln 1, Neb., secretary.

Tri-State (Arkansas, Mississippi, Tennessee) Veterinary Conference. Annual meeting. Peabody Hotel, Memphis, Tenn., Jan. 16-17, 1950. H. W. Nance, Lawrenceburg, Tenn., secretary.

• • •

Regularly Scheduled Meetings

Bay Counties Veterinary Medical Association, the second Tuesday of each month. George E. Martin, 530 Stockton Ave., San José, Calif., secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. Thomas Eville, Route 1, Box 136H, Fresno, Calif., secretary.

Chicago Veterinary Medical Association, the second Tuesday of each month. Robert C. Glover, 1021 Davis St., Evanston, Ill., secretary.

East Bay Veterinary Medical Association, bimonthly, the fourth Wednesday. O. A. Soave, 5666 Telegraph, Oakland, Calif., secretary.

Greater St. Louis Veterinary Medical Association. Ralston-Purina Research Building, St. Louis, Mo., the first Friday in February, April, June, and November. W. C. Schofield, Dept. of Animal Pathology, Ralston-Purina Co., St. Louis 2, Mo., secretary.

Houston Veterinary Medical Association, Houston, Tex., the first Thursday of each month. Edward Lepon, Houston, Tex., secretary-treasurer.

Illinois Valley Veterinary Medical Association, the second Wednesday of even-numbered months. R. A. Case, 400 S. Garden St., Peoria, Ill., secretary.

Indiana Tenth District Veterinary Medical Association, the third Tuesday of each month. J. J. Arnold, Box 144, New Castle, Ind.

Jefferson County Veterinary Society, Louisville, Ky., the first Wednesday evening of each month. F. M. Kearns, 3622 Frankfort Ave., Louisville 7, Ky., secretary.

Keystone Veterinary Medical Association. School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pa., the fourth Wednesday of each month. Raymond C. Snyder, N. W. Cor. Walnut St. and Copley Rd., Upper Darby, Pa., secretary.

Massachusetts Veterinary Association. Hotel

(*Continued on page 30*)

IMPORTANT NEWS!

Mastics® for Mastitis*

NOW — in 2 Dosage Strengths

*(Caused by Strep. agalactiae)

MASTICS *are the original penicillin bougies. These slender, wax-like sticks of Penicillin "G," inserted in the teat canal, dissolve in the milk to medicate all parts of the teat lining, cistern and large ducts. Foil-sealed,* **MASTICS** *are dated and stored under refrigeration to ensure potency.*

MASTICS are now available in *two* dosage strengths—the new 100,000 Unit **HIGH POTENCY MASTICS**, and the 25,000 Unit regular strength **MASTICS** now used so widely in mastitis (caused by Strept. agalactiae).

This new strength is now offered to meet the recommendation of some authorities for a minimum dosage of 100,000 Units in each quarter. Its use ensures fully adequate treatment in all cases.

MASTICS are sold only through Veterinarians, as our advertisements in dairy breed journals plainly state. We believe the treatment of all animal diseases should remain under your trained guidance.

Don't confuse **MASTICS** with later imitations, closely resembling genuine **MASTICS** in name and appearance, but available for use without supervision. You can sell your clients **MASTICS**, the *original* penicillin bougie, at a figure well below the lowest store price—and still retain control of treatment. If your distributor cannot supply you, order direct from us. Delivery charges prepaid if check is sent with order, otherwise C.O.D. plus charges. Be sure to specify strength desired.

NEW PRODUCT-NEW USE

MASTICS have a new and effective use, of interest to every animal practitioner—*the treatment of Abscess*, in both large and small animals. For this purpose, **MASTICS** are both effective and convenient. After incision and drainage, one or more **MASTICS** of the required strength are inserted in the abscess cavity.

MASTICS, dissolving in the serous exudate, release an effective dose of Penicillin "G"—and further surgery is seldom required. Studies on this use of **MASTICS** are now in progress, and publication of the results obtained is expected shortly.

	Packages of 25	Packages of 100
HIGH POTENCY MASTICS (100,000 Units each)	$6.50	$33.00
REGULAR STRENGTH MASTICS (25,000 Units each	$4.75	$18.00

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QUICKER RESULTS WITH

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Accepted and used by the profession since 1900

in the treatment of Splints, Spavins, Curbs, Side Bones, Inflamed Tendons, Bursal Lameness, Etc.

Single Bottle	**$ 2.00**
¼ Dozen and One FREE	**5.00**
½ Dozen and Two FREE	**9.00**
1 Dozen and Four FREE	**17.00**
2 Dozen and Four FREE	**28.00**

Packaged Medicines for Veterinarians

Back in 1896 we began our unique service of supplying the Veterinarian with a line of effective Pharmaceutical Products labeled with his name and address, ready to be dispensed at his office or carried on professional calls. This valuable Carter-Luff service provides the busy practitioner with additional income yet, at the same time, provides many hours of needed relaxation during his weekly routine.

Write for Descriptive Price Sheet of a Hundred Dispensing Products

CARTER-LUFF CHEMICAL CO.
Hudson, N. Y.

(Continued from page 28)

Statler, Boston, Mass., the fourth Wednesday of each month. C. L. Blakely, Angell Memorial Animal Hospital, 180 Longwood Ave., Boston, Mass., secretary-treasurer.

Michiana Veterinary Medical Association, Hotel Elkhart, Elkhart, Ind, the second Thursday of each month, at 7 p. m. R. W. Worley, 3224 Lincoln Way West, South Bend, Ind., secretary.

Michigan, Southeastern Veterinary Medical Society. Herman Kiefer Hospital, Detroit, Mich., the second Wednesday of each month from October through May.

Milwaukee Veterinary Medical Association. Wisconsin Humane Society, 4150 N. Humbolt Ave., Milwaukee, Wis., the third Tuesday of each month. Kenneth G. Nicholson, 2161 N. Farwell Ave., Milwaukee, Wis., secretary.

New York City Veterinary Medical Association. Hotel Pennsylvania, New York, N. Y., the first Wednesday of each month. C. R. Schroeder, Lederle Laboratories, Inc., Pearl River, N. Y., secretary.

Northern San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month. I. N. Bohlender, Box 588, Turlock, Calif., secretary.

Orange Belt Veterinary Medical Association, the second Monday of each month. James R. Ketchersid, 666 East Highland Avenue, San Bernardino, Calif., secretary.

Peninsula Veterinary Medical Association, the third Monday of each month. E. W. Paul, Box 866, Redwood City, Calif., secretary.

Redwood Empire Veterinary Medical Association, the second Tuesday of every other month. Charles D. Stafford, Novato, Calif., secretary.

Sacramento Valley Veterinary Medical Association, the fourth Friday of each month. R. C. Goulding, 11511 Capitol Avenue, Sacramento, Calif., secretary.

San Diego County Veterinary Medical Association, the third Tuesday of each month. Mitchell Smith, 3740 Rosecrans Boulevard, San Diego, Calif., secretary.

Southern California Veterinary Medical Association, the third Wednesday of each month. H. I. Ott, 10326 East Artesia Blvd., Bellflower, Calif., secretary.

• • •

Foreign Congresses

Seventh Pacific Science Congress. New Zealand, Feb. 2-22, 1949. Mr. Harold J. Coolidge, 2101 Constitution Ave., Washington 25, D. C., executive secretary.

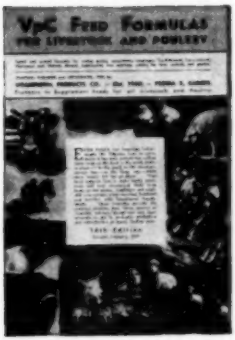
Fifth International Congress of Comparative Pathology. Istanbul, Turkey, May 17-20, 1949. Dr. Louis Grollet, 7 rue Gustave Naduad, Paris 16 e, France, general secretary of permanent committee.

National Veterinary Medical Association of Great Britain and Ireland. London, England, Aug. 12-15, 1949. F. Knight, General secretary, 36, Gordon Square, London, W.C.1.

Fourteenth International Veterinary Congress. London, England, Aug. 8-13, 1949. *General Secretary, Permanent Committee:*

(Continued on page 40)

Home-made Concentrates for Growing Pigs



Write for your desk copy of this VpC 36 page, illustrated Feed Book. Tells how to mix home grown grains, concentrates and Vitamineral Supplements to make feeds that go further, do more, cost less.

These provide economical sources of proteins, fat and fiber plus sources of vitamins thru A and D feeding oil, irradiated yeast, brewer's yeast and yeast cultures; calcium; phosphorus; and such trace minerals as iodine, cobalt, iron, copper, zinc, potassium and manganese. They can be suggested to swine raisers with full confidence.

Concentrate for Pigs under 75 lbs.—not on good pasture

This concentrate may be fed in a separate compartment of a self-feeder with grains in other compartments. Pigs will balance their own feed requirements.

600 lbs. tankage
600 lbs. dehyd. alfalfa meal, 17%
600 lbs. soybean oil meal
200 lbs. Con-o-mineral
40 lbs. salt

2040 lbs.

APPROXIMATE ANALYSIS: *Protein*, 35.0%; *fat*, 4.0%; *fiber*, 10.0%.

Concentrate for Pigs under 75 lbs.—on nutritious pasture

This concentrate differs from the one opposite in that it contains no alfalfa meal. Feed in a separate compartment of a self-feeder with grains in other compartments.

500 lbs. tankage
1200 lbs. soybean oil meal
300 lbs. Con-o-mineral
40 lbs. salt

2040 lbs.

APPROXIMATE ANALYSIS: *Protein*, 40.0%; *fat*, 4.5%; *fiber*, 4.0%.

VITAMINERAL PRODUCTS CO., PEORIA 3, ILLINOIS

Via-D-Mineral Con-o-mineral Viamineral Viaferm

OPTHALMIDINE
Tablets

For an efficient, economical eye-wash

One tablet makes 2 ounces of antiseptic collyrium for dispensing or hospital use.

Tube of 10 Tablets $1.00

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STEWART CLIPMASTER

NEW More Powerful Motor . . . 25% greater speed

CLIPS Your dogs faster, better

Clip your animals the fast, easy way with the new Stewart electric Clipmaster. It's the clipper with the quiet, 30% more powerful, air-cooled, ball-bearing motor with 25% greater speed inside the cool Easy-Grip handle. Has anti-friction tension control that assures perfect tension between blades and provides easy adjustment. Special bottom clipping blades available for all breeds of dogs. Stewart clipping equipment is available at all good hardware and implement dealers. $32.50. (Denver and West, $32.75.)

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Deadline for want ads 15th of month preceding date of issue.

Names of classified advertisers using key letters cannot be supplied. Address your reply to the key letters, c/o JOURNAL of the AVMA, 600 So. Michigan Ave., Chicago 5, Ill., and it will be transmitted to the advertiser.

Wanted—Positions

Graduate veterinarian with eight years' experience, now attending medical school, desires position for summer months. Single; will travel. Address "Box F 18," c/o Journal of the AVMA.

June, 1949 Ohio State graduate, 25, married, 1 child, Christian, one summer's experience, desires assistantship leading to partnership or full ownership of modern small animal hospital. Address Paul Brehm, 2317 Adams Ave., Columbus, Ohio.

Senior student, available June 10 to October 1, by month or for entire summer. Will go anywhere. Send particulars; prompt reply guaranteed. Address "Box G 9," c/o Journal of the AVMA.

Iowa State College junior desires summer position with practicing veterinarian. Mixed or large animal practice preferred. Address "Box G 10," c/o Journal of the AVMA.

Cornell graduate, two years' experience in mixed practice, desires assistantship with small animal practitioner. Age 30, married, Christian, has car. Address "Box G 11," c/o Journal of the AVMA.

June, 1949 Kansas State College veterinary graduate, 30, married, desires assistantship in mixed or large animal practice. Previous experience in dairying and artificial insemination and interested in breeding work. Address "Box G 6," c/o Journal of the AVMA.

Experienced, married, Protestant veterinarian desires position as an assistant leading to partnership in small or mixed animal practice. Virginia or Pennsylvania preferred. Address "Box G 8," c/o Journal of the AVMA.

D.V.M. desires position with ethical drug or biological house, either sales or other contact work. Excellent speaker. Reason for quitting practice will be explained to prospective employer. Address "Box G 2," c/o Journal of the AVMA.

Veterinarian desires position in an executive, supervisory, or inspectorate position relative to abstract writing, sales promotion, or production of pharmaceutical or biological products. Any location. Address "Box G 3," c/o Journal of the AVMA.

Wanted—Practices

WANTED TO BUY—Small animal practice in eastern Pennsylvania or New Jersey. No objection to some large animal work. Living quarters and hospital preferred. Substantial down payment available. Address "Box F 8," c/o Journal of the AVMA.

Desire to buy or lease small animal practice, Detroit area preferred. Would consider working arrangement leading to eventual ownership. Experienced in x-ray and newer techniques in diagnostics and surgery. Give complete details. Address "Box G 14," c/o Journal of the AVMA.

(*Continued on page* 34)

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LOS ANGELES 46, CALIFORNIA

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United States

Sales Representatives for:

T.P.C.* VITAMIN WAFERS

FOR DOGS

and other small animals

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- Uniform Constant Heat
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BY USING BILLS AND STATEMENTS

Dr. Wyse knows that a patient's feeling of gratitude brings immediate payment IF a bill is sent AT ONCE. He knows that a delay in sending a bill can make a bad debt and lose a patient. Some patients can't or won't pay until the end of a month. So, Dr. Wyse sends a business-like statement at that time and another every month. He has practically NO collection problem.

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Although Dr. Wyse' bills and statements are nicely printed on specially-made "HAMMERMILL" bond they cost him ONLY $4.25 for each 1,000! That's what we charge and his other stationery costs him just as little. What are YOU paying? Are you satisfied?

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(*Continued from page 32*)

WANTED TO LEASE—Small animal practice in Southwest. Will not consider Los Angeles or Coast area. Prefer practice offering considerable ear trimming. Address "Box G 1," c/o Journal of the AVMA.

Graduate, experienced veterinarian wants to lease or buy active small animal or mixed practice in any state. Would prefer practice in Pennsylvania, New Jersey, Maryland, or Delaware. Give full details. Can settle suitable practice at once. Address "Box G 16," c/o Journal of the AVMA.

Wanted—Veterinarians

Meat inspector, city of Kalamazoo. Must be licensed to practice as a veterinarian in Michigan. Graduate of an accredited college or university with a degree in veterinary medicine. Salary open. Application blanks may be secured from the Personnel Clerk, Personnel Office, City Hall, Kalamazoo, Mich.

Graduate veterinarians wanted for regulatory work in state of Oregon. Beginning salary approximately $4,000. Good opportunity for advancement. Address State Civil Service Commission, 444 Center Street, Salem, Oregon.

Veterinarian, Connecticut license or willing to take examination in July. Full charge modern hospital, apartment, good future for right, experienced man. Address Greenwich Animal Hospital, 430 W. Putnam Avenue, Greenwich, Conn.

Veterinarian wanted for staff of small animal hospital, also opportunity to do some large animal practice. State age, weight, religion, nationality, and marital status. Include snapshot and references. Address Dr. R. A. Self, 800 N. Oak Cliff Blvd., Dallas, Texas.

Graduate veterinarian wanted as assistant in mixed practice. Experience in dairy practice preferred, single, salary according to ability. Address Barrett and Noonan, 490 E. Cuyahoga Falls Ave., Akron 10, Ohio.

For Sale or Lease—Practices

FOR SALE—Mixed practice in prosperous, eastern farming section near large city. Property includes bungalow and hospital attached. Three acres of land overlooking beautiful countryside. Price $15,000. Address "Box G 5," c/o Journal of the AVMA.

FOR SALE—Pet hospital, complete. Owner retiring. Little down payment needed. Address Dr. Bachman, 1547 Superior Avenue, Cleveland, Ohio. Telephone Cherry 2006.

FOR SALE—Small animal practice established twenty years. On main thoroughfare in Long Island. Also derives good patronage from New York City. Owner changing climate. Address N. D. Thomas, 60 East 42nd Street, New York City, N. Y.

FOR SALE—Mixed practice in rich livestock area in Indiana. Includes good frame house, office building, and garage. Fully equipped with drugs and instruments. This location can be purchased for the price of the real estate alone. Reason for selling; other interests. Address "Box G 13," c/o Journal of the AVMA.

FOR SALE—Established mixed practice in Connecticut. Several thousand dollars state testing with practice. Equipped with x-ray, sterilizer, cabinets, and cages. Priced at $7,500. Address "Box G 12," c/o Journal of the AVMA.

FOR SALE—General practice in southeastern Wisconsin. Chiefly dairy practice; also abundant small animal practice. No real estate to buy. Price based on drug inventory. Instruments and equipment optional. Owner leaving due to personal interests. Address "Box G 15," c/o Journal of the AVMA.

FOR SALE—Large animal practice in western Oregon, mainly dairy cattle. Three-bedroom house on 2 lots. For price of real estate alone, $6,500. Address "Box G 7," c/o Journal of the AVMA.

FOR SALE—Small animal hospital also includes large animal practice. Established over 20 years, consisting of hospital, 2-car garage with

(*Continued on page 36*)

New **CRAWL-X** **Tested**

for complete and quick control of:

DOG — FLEAS
- TICKS
- LICE
- MANGE

SWINE — MANGE
- LICE

and many other indications.

Crawl-X is a 50%, by weight, water-soluble concentrate of refined, veterinary grade chlordane. It does not contain kerosene or other toxic solvents. It has a pleasant odor and does not taint meat animals or pets.

SO EFFICIENT!

A single application of Crawl-X (diluted) usually suffices to control the pests on the animals or on the premises and protect them against reinfestation for some time.

SO EASY TO USE!

Crawl-X Concentrate, diluted with water as per detailed directions, can be applied as a spray, as a dip or post-bath rinse on animals, or as a space spray on premises or grounds.

SO ECONOMICAL!

One pint of Crawl-X Concentrate diluted with water makes 16 gallons of a 0.50% dip, enough to treat many animals; or 4 gallons of a 2% space spray to rid kennels and runs of insect pests including roaches, water bugs, ants, etc.

$4.80 worth of Crawl-X Concentrate takes care of at least 4000 square feet!

Write for descriptive literature.

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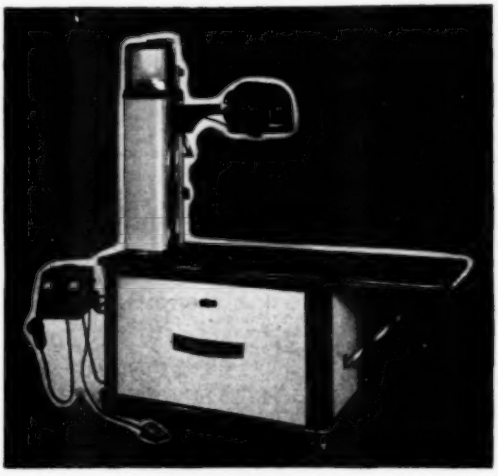

THE ANIMAGRAPH

Illustrating radiographic position. Tube lowers straight down under table for fluoroscopy. Units removable as portable. Less than 30 seconds for any change.

MAKE SURE THE X-RAY MACHINE YOU BUY REFLECTS SOME THOUGHT OF THE VETERINARIAN IN ITS DESIGN. Don't make the mistake of purchasing a medical outfit designed for use on the human body.

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— NEW MODEL —

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4 Outfits in **1** Exclusive Veterinary Design **S**hock-proof safe ure

The only complete x-ray machine designed from the ground up for the exclusive use of the veterinarian.

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Bottoms are water-proof trays with ½" turned up edges, heavily soldered together. Braced, aluminum painted. 1½" angle iron frames. Door frames 1" O. D. pipe. Dog proof mesh filler welded to frame. All sheets heavily galvanized.

Completely Assembled. Satisfaction Guaranteed.
SIZES: 3 upper stalls 24" x 24" x 28" deep.
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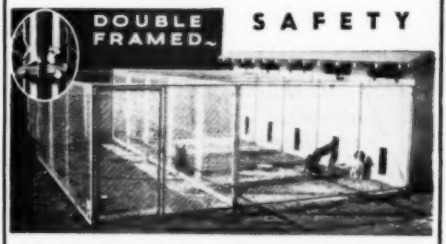
Overall size: 6' wide x 5'6" high x 28½" deep.

Stalls Stand 6 in. off Floor.



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Ford DOUBLE FRAME Panel Runs insure SAFETY for your dogs. Chain link fabric is rust resistant, cannot be spread; permanently locked by INNER BAR FRAME. NO TIE WIRES TO RUST. Clamp together. No bolt holes to match. Portable or permanent construction.

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(*Continued from page 34*)

receiving kennels, and a modern 7-room residence on about 3 acres of land. Located in a small, progressive town about 30 miles from Cleveland. Owner will finance; selling because of illness. Address Norman A. Beck, 1661 Rydalmount Road, Cleveland Heights, Ohio. Telephone Fairmount 1407.

FOR SALE—Growing small animal hospital. Main thoroughfare in Los Angeles area. Modern, well equipped, new drugs, 12 runs, x-ray, neon signs, etc. No property involved; excellent long-term lease. Only replies to those able to personally see hospital will be answered. $10,000 cash, complete. Address "Box F 6," c/o Journal of the AVMA.

TO LEASE—Well-established Vermont practice with all equipment including house and jeep if desired. Busy large and small animal practice; possibility of purchase after a year for the right man. Address "Box G 4," c/o Journal of the AVMA.

FOR SALE—Small animal practice, established twenty years, main thoroughfare Long Island, New York. Modern brick hospital completely equipped, capacity 75. Owner's health forces relinquishing of practice. Opportunity for 1 or 2 veterinarians. Address "Box F 9," c/o Journal of the AVMA.

FOR SALE—Mixed practice, excellent location on main highway in central Connecticut, includes modern, completely equipped veterinary hospital and office. Address "Box G 17," c/o Journal of the AVMA.

For Sale—Miscellaneous

Having sold my hospital, I now offer my equipment for sale. Write for invoice prices. Address Dr. Roy E. Kluck, 1614 Huffman Blvd., Rockford, Ill.

FOR SALE—Prof-xray, portable, shock proof, fully counter balanced head, tube, and transformer completely oil-immersed, 80 P.K.V., 20 Ma., 10-step voltage control, variable milliamperage. Used but has brand new tube. Complete with carrying case, instructions for operation, and Universal timer. Value $570, a snap at $395. Surgical Supply Service, 825 Walnut Street, Philadelphia 7, Pa.

FOR SALE—Lot 50 x 183 M1 zone, Lankershim Blvd., North Hollywood, Calif. Address F. M. Phelps, 212 S. Western Ave., Los Angeles 4, Calif. Telephone Drexel 5175.

Books and Magazines

DOGGY SENTIMENT POSTCARDS—16 in set. Ideal for office or home; usable as mailing cards. $1 set; 5 sets $3. Keep up on dogs—Dog World, 1 yr. $3; 2 yr. $5. Judy Publishing Co., 3323 Michigan Blvd., Chicago 16, Ill.

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Veterinary medicine, basing its opinion on long experience at close range, is inclined to deplore the fabulous prices paid for breeding stock, because, recalling the 1920's, history is surely repeating itself.

In the interest of sanitation, there is a need for simplifying the design of milking machines.—*M. P. Baker, Iowa State College.*

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PROVE KEN-L-RATION
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Clear Bright Eyes...
Thick Glossy Coats...
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Made With *LEAN, RED MEAT**

Plus All Known "Dog Health" Vitamins

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—a useful aid in identification of newly isolated strains of intestinal bacteria.

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Black Hog More than Skin Deep

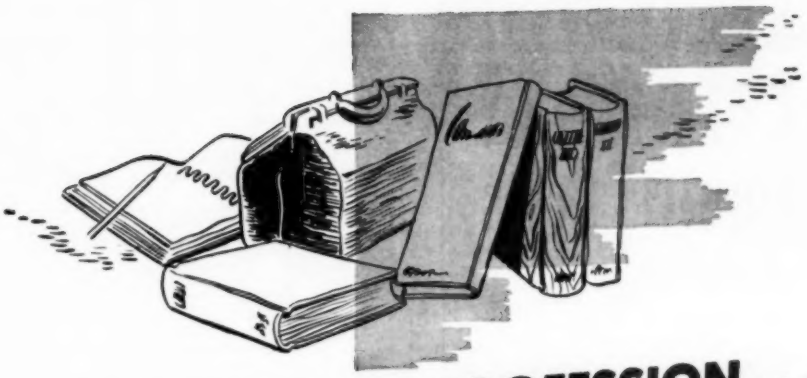
During the normal operation of the abattoir at Texas A. & M. College, a black-skinned hog was found to be black under the skin as well. The carcass was normal in other respects. The hog was from a normal dam and sire. The cause of the abnormal deposit of melanin under the skin was not ascertained. Lyman Peck, associate editor of *Feedstuffs*, commenting on this case, recalled a similar occurrence on a Michigan farm. The farmer in that case blamed the feed, although other hogs fed the same rations were not affected.

The report of the Meat Inspection Division of the Bureau of Animal Industry reveals that the carcasses of 54 cattle, 80 calves, 123 sheep, 1 goat, 325 hogs, and 314 horses were condemned because of melanosis during the fiscal year 1948. Although these figures may seem rather high, from a percentage standpoint it is apparent that the condition is extremely rare, inasmuch as 48,553,000 hogs and 14,253,009 cattle were slaughtered in the federally inspected plants during the year.

Geese.—Little is devoted to geese in the poultry magazines or in the poultry columns of the farm press. A review of a new book on "Geese and Ducks" (*World's Poult. Sci. J.*) says that all other books on geese are long out of print and also hints that the knack of cooking goose is a lost art.

Erare Humanum Est.—An Hungarian historian has recently reported that Christopher Columbus was a pirate fleeing from an assassin when he discovered America. "Columbus, like Lincoln," says Prof. S. E. Morrison of Harvard, "seems to get particular attention from nuts."

Scientific research is the basis of our progress against poverty and disease.—



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(Continued from page 30)

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Where Human and Veterinary Medicine Part Company

In the study of psychosomatic pathology, as distinguished from purely physical ailments, human medicine has no more use for knowledge derived from animals than veterinary medicine has for pathology of mental derangements. Aberrations of the mind which seem to be charting a new course for medical education do not furnish the veterinarian any clinical material. Being what it is in health and in jitters, the mind will never broaden the scope of animal pathology. At the point where human medicine has to set out to explore the morbidities of the human mind, veterinary medicine can go on practicing the carpentry of the art, unworried over the techniques of mental readjustment. The mind of an animal, such as it has, is reliable.

"Biological Products."—Out of a chummy letter from a denazified Bavarian we lift: "Since spending many pleasant hours with officers of your Veterinary Corps (after the shooting stopped), I have been reading your veterinary journals. I am thrilled with the hope they convey to our war-torn people. . ."

"P. S. By the way, since nearly everything we use over here is either of plant or animal origin, just what do you mean by *biological product?*"

Says Farm Adviser Ray Watson of Marion County, Ill., "Fresh-killed, eviscerated, and cut up frozen poultry is getting the majority of the poultry business in our towns and cities today." (*Agric. Leaders' Digest*, Oct. 19, 1948). And, in the manner of speaking, the farmer's wife is holding the bag.

ONE DOSE DAILY!

Sulfathalidine 92.5%-94.3% Effective in Treatment and Prevention of Swine Enteritis

Sulfathalidine *phthalylsulfathiazole*, Sharp & Dohme's newest sulfonamide, is exceptionally efficient against swine enteritis, and is given orally *just once a day!*

Sulfathalidine was effective in treatment of 92.5% (804) of 869 feeder pigs with enteritis.[1] Given prophylactically to 1,022 feeder pigs, SULFATHALIDINE prevented post-vaccination enteritis in 964 or 94.3%.[1] Other authorities[2] also report the exceptional efficacy of SULFATHALIDINE in prophylaxis and treatment of this costly and extremely contagious disease. Moreover, the drug has proved remarkably safe and successful in treatment of calf (white) scours, bacillary dysentery of dogs and cats, and rabbit enteritis.

Given orally, SULFATHALIDINE is nontoxic, since only about 5% is absorbed, and 95% of its antibacterial action is inside the intestinal tract.

Oral Dose Forms:

No. 2264—4.0 Gm. (61.7 gr.) tablets (slotted) in bottles of 100 and 500.
No. 2261—0.5 Gm. (7.7 gr.) tablets (slotted) in bottles of 100 and 1,000.
No. 2267—¼-lb. and 1-lb. bottles of powder.

1. Vet. Med. *42*:170, May 1947 2. N. Am. Vet. *27*:564, Sept. 1946; J. Am. Vet. M. A. *107*:338, Oct. 1945; J. Am. Vet. M. A. *108*:7, Jan. 1945

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phthalylsulfathiazole (VETERINARY) ®

VETERINARY DIVISION SHARP & DOHME PHILADELPHIA 1, PENNA.

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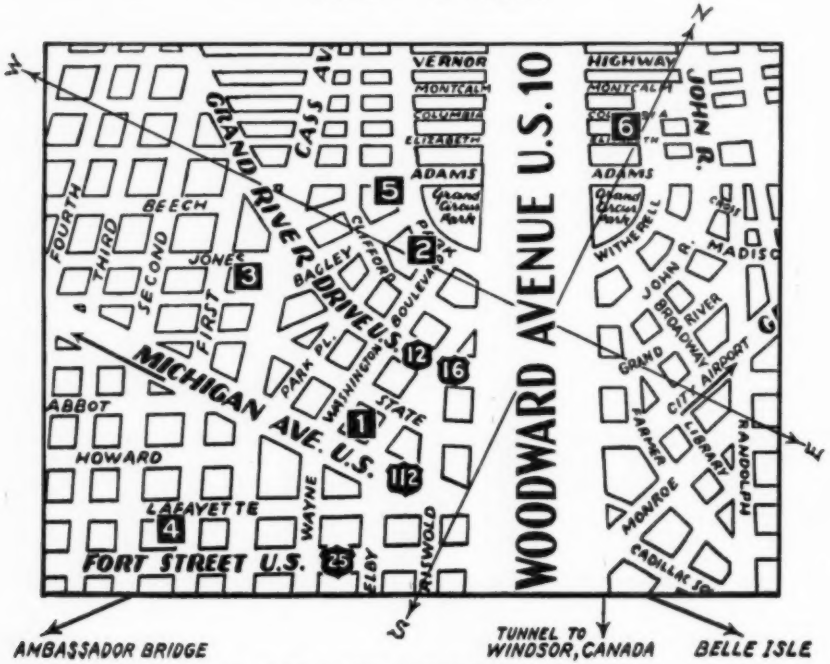
5. Tuller 6. Wolverine



12, 16, 25, and 112 are U. S. Highways.

HOTEL RESERVATIONS — DETROIT SESSION

Eighty-Sixth Annual Meeting, American Veterinary Medical Association

July 11-14, 1949

All requests for rooms will be handled directly by the various hotels. An ample number of rooms of all types has been assured but the deadline for reservations against the number allotted for the AVMA Convention is 30 days prior to the dates of the meeting. Therefore, your request for accommodations should be sent in before June 10, 1949.

Be sure to indicate your first, second, and third choice hotel. *Date and time of arrival must be given, also date of expected departure.*

Address your request to the hotel of first choice; if this hotel cannot accommodate you, it will be referred to the Detroit Convention and Tourist Bureau which will then pass it on to the hotel of your next choice. You will receive a confirmation of your reservation directly from the hotel.

The Book Cadillac and Statler Hotels will serve as Joint Headquarters and each has allotted a good number of rooms for the AVMA Convention. However, these two hotels will not be able to meet all requests and, therefore, four other near-by hotels have been listed, giving a good range of accommodations and rates. All are first-class, and the locations of them are shown on the map on the opposite page.

The number of single rooms is limited and double occupancy is urged for as many as possible.

Schedule of Hotel Rates—See Locations on Opposite Page

Hotel	Single	Double Bed	Twin Beds	Suites
Book-Cadillac (Headquarters Hotel) 1114 Washington Blvd.	$3.50 up	$7.00 up	$7.00 up	$15.00-$32.00
Statler (Headquarters Hotel) 1539 Washington Blvd.	$3.50 up	$6.50 up	$7.50 up	$13.50-$25.00
Detroit Leland 1701 Cass St.	$3.75 up	$6.25 up	$7.00 up	*
Fort Shelby 525 W. Lafayette St.	$3.50 up	$6.00 up	$6.50 up	*
Tuller 521 Park Ave.	$2.75 up	$5.00 up	$6.00 up	*
Wolverine 50 E. Elizabeth St.	$2.75 up	$5.00 up	$7.00 up	*

*Inquire direct to hotel for rate and availability of suites.

Cut Off Here

HOTEL RESERVATION FORM—AVMA CONVENTION

(Please type or print)

To: Hotel (name)..... Date .....

Address .....

Detroit, Mich.

Please make reservations noted below:

First choice Hotel.....

Second choice Hotel.....

Third choice Hotel.....

Accommodations and Rate Desired

Single Room .....Rate.....

Double Room .....Rate.....

Twin Bed Room.....Rate.....

Parlor Suite .....Rate.....

Two Bedroom Suite.....Rate.....

Other (specify) .....Rate.....

Arriving on (date).....at .....a.m.....p.m.

Leaving on (date).....at .....a.m.....p.m.

Room will be occupied by:

Name .....Address .....

Name .....Address .....

Name .....Address .....

Name .....Address .....

I understand that, if the hotel of first choice to which this request is addressed cannot furnish the accommodations desired, it will be referred promptly to the Detroit Convention Bureau for attention.

Signed .....

Street Address .....

City .....Zone .....State .....

Special Offer—

AVMA DIRECTORY

The AVMA still has a limited number of copies of the 1947 Directory which will be sold to members and student chapter members on a "first come, first served" basis at $1.00 each postpaid. (The regular member price is $2.00.)

A new Directory is now being compiled, but it will not be available until the end of this year. In the meantime, the 1947 edition will continue to serve as a valuable source of information, including:

- **Names and addresses of 12,000 veterinarians (as of April 15, 1947).**
- **Digests of state and provincial practice acts.**
- **Addresses of national and international veterinary associations and related organizations.**
- **State, territorial, and provincial veterinary associations.**
- **AVMA constitution, by-laws, and code of ethics.**
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Powd. Elecampane	5%
Potassium Nitrate	5%
Ferrous Sulfate, dried	5%
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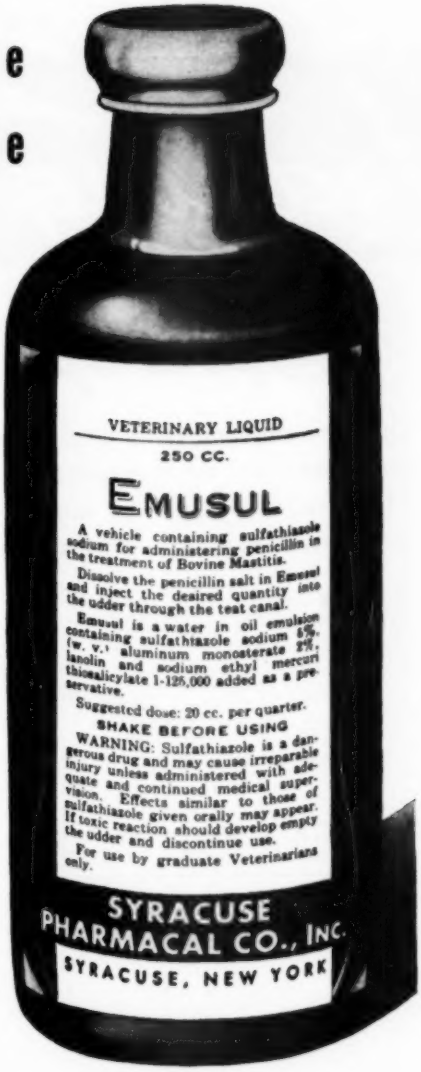
Veterinary Division

The Unpredictable Teen-ager

Watching a prodigious milker selling for over $10,000 in the auction ring, an old veterinarian who knew her calfhood well, remarked: "You can't tell the luck of a lousy calf." Sixty years ago, a schoolmate of mine used to kick his shoes and socks under the bed, pitch his dirty linen into a corner of the closet, soil the classroom floor with his muddy boots, not to mention other habits that made his roommates run a temperature. A few days ago, I found him seated in a luxurious office of meticulous order and a workshop to match. The surrounding grounds would do credit to a landscape artist. Diagnosis: He married the right girl.—*Talliremal.*

Income of the Average Physician.—The average net income of active, private physicians in 1947 was $9,884. The average gross income was $17,476. This was an increase of 14 per cent over 1943. However, in this same period, the income of all gainfully employed people rose 32 per cent. The average net income for all specialities such as psychiatry, surgery, internal medicine, etc., was $14,442.—*From Medical Economics abstr. in Am. Drug., Feb., 1949.*

a penicillin vehicle with sulfathiazole for the treatment of bovine mastitis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250 CC.
EMUSUL
A vehicle containing sulfathiazole sodium for administering penicillin in the treatment of Bovine Mastitis.
Dissolve the penicillin salt in Emusul and inject the desired quantity into the udder through the teat canal.
Emusul is a water in oil emulsion containing sulfathiazole sodium 5%, (w. v.) aluminum monostearate 2%, lanolin and sodium ethyl mercuri thiosalicylate 1-125,000 added as a preservative.
Suggested dose: 20 cc. per quarter.
SHAKE BEFORE USING
WARNING: Sulfathiazole is a dangerous drug and may cause irreparable injury unless administered with adequate and continued medical supervision. Effects similar to those of sulfathiazole given orally may appear. If toxic reaction should develop empty the udder and discontinue use.
For use by graduate Veterinarians only.
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in the original H-G plastic sprayer-tubes provide a convenient method of applying finely powdered medicaments into the ear, the eye, the mouth, the interdigital spaces, operatic incisions, wounds, and abrasions of animals.

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Antistaphylococcic and antistreptococcic; containing sulfanilamide 50% and sulfathiazole 50%.

Pkg., 6—1/2 oz. tubes $2.40

TYROQUIN SPRAY POWDER

A mild antiseptic dressing powder; containing hydroxyquinoline sulphate 1:100, and tyrothricin 1:1000.

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An antiseptic for treating eye conditions; containing calomel 5%, sulfathiazole 5%, sulfanilamide 3%, acriflavine 1%, boric acid q.s.

Pkg., 6—1/2 oz. tubes $2.20

In Plastic Sprayer Tubes

with dispensing labels

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TYMPANOL—for treatment of bloating in ruminants—is a suspension of highly polymerized methyl silicone which quickly relieves bloat by increasing surface tension of gas-entrapped froth within the ruminal food mass.

The dose for cattle—either injected directly into the rumen or with water by drench or stomach tube—is 100 cc.; for sheep and goats, 25 cc.

TYMPANOL (liquid) is entirely non-toxic and does not, in any way, interfere with collateral medication. And, as to its *proved effectiveness* . . . of 155 actual cases of bovine tympany treated with Tympanol, 115 made perfect recoveries.

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Box of Six—100 cc. Vials....$3.90 Six Boxes—36 Vials....$22.70

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